

ELVE WITH BOUND VOLS.

RESEARCH NUMBER

State University of Iowa  
Medical Library

*the*

# Journal

*of the association for physical  
and mental rehabilitation*



MARCH-APRIL, 1957

VOL. 11, NO. 2

SHELF WITH BOUND VOLS.

# PRESTON

## *A Complete Line*

### FOR PHYSICAL MEDICINE REHABILITATION

#### REHABILITATION:

Walking Parallel Bars and Exercise Staircases of various designs; Posture Mirrors, single and triple; Gymnasium Mats in various thicknesses and coverings; Bicycle Exercisers; Restorator; Elgin Progressive Resistance Exercise Units; Quadriceps-Gastrocnemius-Footdrop Boots; Ankle Exercisers; N-K Units; Dumbbells, iron and wood; Indian Clubs; Wall Pulleys; Door Pulley Assemblies; Guthrie-Smith Suspension Apparatus; Stall Bars; Shoulder Wheels with height adjustment; Standing (Tilt) Tables; Manuflex and Gym Kit; Kanavel Table; Complete line of Bunnell Hand and Finger Splints; Keystone Splint for ambulation; Sayre's Headslings of various designs in leather or canvas; Hausted Tractionaid.

#### INVALID EQUIPMENT:

Everest & Jennings Wheelchairs; Hollywood Wheelchairs; Commodes; Walkers and Walking Aids for every need; Hydraulic Patient Lifters for bed, wheelchair, auto and bath tub; Self propelled Wheelstretchers, adjustable in height; Stryker Turning Frames; Large selection of Crutches, hardwood and aluminum; Canadian Crutches; Tripod and Four-legged Canes.

#### TREATMENT ROOM FURNITURE:

Large selection of Treatment Tables — upholstered or with separate foam rubber pads; Footstools; Two-Step Footstool; Revolving Stools; Utility Tables; Timers; Metronomes.

**ALL your needs supplied  
by ONE reliable source**

#### SELF-HELP DEVICES:

Bath Tub Seats and Rails; Toilet Armrests; Raised Toilet Seats of various types; Incontinent Aids; Elastic Shoe Laces; Telephone Holder; Automatic Page-Turner; Pick-up Sticks-Reachers; One Arm Knife and Fork Combination and other ADL Devices.

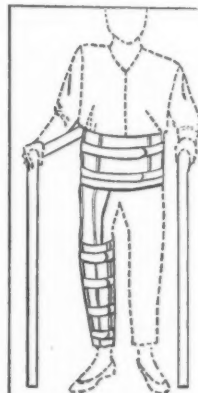
#### DIAGNOSTIC APPARATUS:

Chronaximeters; Dynamometers; Newman Myometer; Goniometers; Stop watches; Vitalometers and Dry Spirometer.

#### *Featured Item of Interest*

##### THE NEW KEYSTONE SPLINT

Useful in ambulation training of patients, particularly hemiplegics and paraplegics. Also used in determining brace requirements and for immobilization of fractures. Made of washable preshrunk materials; has hardwood stays for knee and/or hip stabilizations, and 6 straps which can be placed in various positions.



*Write For  
Illustrated Literature*

Catalog No. PC 4395—  
Price Complete with  
Carrying Case \$33.50

*With our large stock of equipment you  
are always assured of prompt delivery.*

**Write for Your Free Copy of our Illustrated  
Catalog #1056  
and for any additional information.**

**J. A. PRESTON CORP.**  
175 FIFTH AVENUE, NEW YORK 10, N. Y.

# NEW FRANKLIN TILT BED

Model M-300

"GETS THEM ON THEIR FEET EARLY"

## USES OF FRANKLIN TILT BED

|                                   |   |
|-----------------------------------|---|
| Cardiac conditions                | (d) Polio                               |
| Rheumatic fever                   | (e) Muscular dystrophy                  |
| Tuberculosis and chest conditions | (f) Multiple sclerosis                  |
| Orthopedic and arthritic          | (g) Cerebral palsy (relaxation)         |
| Neurological disorders            | General medical and surgical conditions |
| (a) Paraplegics                   | (a) Post surgery                        |
| (b) Quadriplegics                 | (b) Diabetics                           |
| (c) Hemiplegics                   | (c) Geriatrics (aged)                   |

Designed to give ease and comfort and provide treatment for patients too weak or ill to be transferred to a Tilt-Table for therapy treatment, the new Franklin Tilt-Bed provides for all of the standard hospital bed positions and adjustments, as well as the important features of tilt-tables. It is excellent for prescribed treatment to aid in weight bearing and prevention of related complications caused by prolonged periods of the body lying in a prone position and for cardiac treatment.

## The New Franklin Bed Conforms

### to Standard Hospital Bed Sizes

No greater floor space area is required for operation of the Franklin Tilt-Bed. It moves through all degrees of the tilting position without any movement from its location.

Motorized tilting mechanism is controlled by a remote control switch operated from any position near the bed. Any position between horizontal and 90 degrees can be attained by gradual adjustment. Operator is free to help the patient or to make adjustments in the spring position.

## SPECIFICATIONS

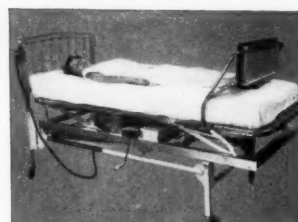
|   |  |
|---|--|
| Bed illustrated is Model M-300  | Casters, 5" locking type, ball-bearing   |
| Spring type, two-crank, side-adjusting Gatch Spring                           | Bed frame, tilts from 0 degrees to 90 degrees by motor operated mechanism (—10° available through spring adjustment) |
| Bed Height, standard or low model on request                                  | Motor, ½ H.P., 110 V, 60 cycle, (single-phase, explosion-proof motor supplied on request)                            |
| Spring Frame, 35" x 80"   | Control switch, remote operating type  |
| Mattress size, 3/0 x 6/8 (Mattress not included — Standard mattress suitable) |  |

Write for literature on this or other Franklin Products

Tilt Table • Mobile Arm Sling Suspension • Finger Exerciser

## FRANKLIN HOSPITAL EQUIPMENT CO.

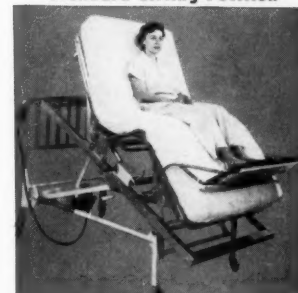
Designers and manufacturers of Hospital Equipment  
116 Academy Street PHONE: Market 2-5187 Newark 2, N. J.



Horizontal Position (0°)



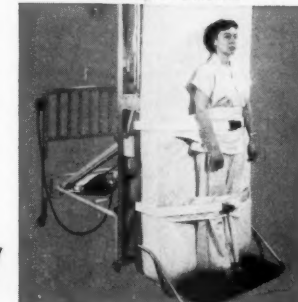
Standard Sitting Position



Cardiac Position



70° Tilt Position



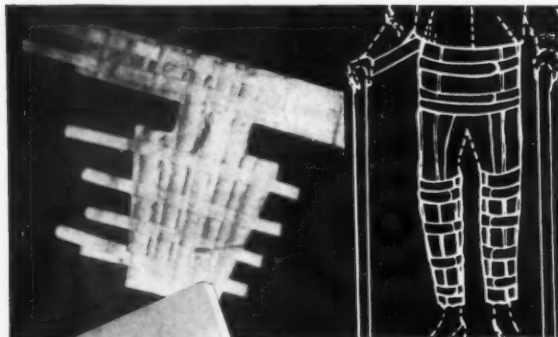
Full Standing Position (90°)



## Two superior **Rehabilitation Products** that speed recovery!



**Confinement loses its boredom** with this new exclusive wheel chair table. Patient can read, write, paint, sew, type—do anything—just as at a desk. Adjustable to fit arms of *any* wheel chair—table top raises, lowers and tilts as desired. Even adjustable for removable sliding book rest. Use with respirator chest shells. Order by No. 5215—\$59.95 each.



**Patients are on their feet in a hurry** with the Keystone Canvas Splint. Lightweight, inexpensive, and sturdy, it has removable wooden stays which adjust to give controlled rigidity and flexibility for adequate support for any size patient.

Helps pre-determine brace requirement, also enables patient to use muscles and practice ambulation while braces are being constructed. Unobstructed X-Ray penetration. Washable, pre-shrunk canvas, web straps, polished birch stays. Complete with attractive, durable case. Order by No. 6197—\$33.50 each.



For the most complete variety of advanced equipment and supplies in the rehabilitation field . . . plus unequalled distribution and service facilities . . . consult your *Rehabilitation Products* catalog first. It is available through our representative in your area, or write today to our Division Office nearest you.

## **Rehabilitation Products**

Division of American Hospital Supply Corporation  
Department JP, 2020 Ridge Avenue, Evanston, Illinois

New York • Chicago • Kansas City • Minneapolis • Atlanta • Washington • Dallas • Los Angeles • San Francisco



The Journal of the Association for  
Physical and Mental Rehabilitation  
MARCH-APRIL, 1957

VOLUME 11

Number 2

Published Bimonthly  
by the Association for  
Physical and Mental Rehabilitation  
1472 Broadway  
New York 36, N. Y.  
Tel. BRyant 9-9642

in  
this  
issue

**EDITORIAL BOARD**

John E. Davis, Sc.D. .... Rehoboth Beach, Del.  
Edward D. Greenwood, M.D. .... Topeka, Kans.  
Richard L. Jenkins, M.D. .... Washington, D. C.  
Lewis A. Leavitt, M.D. .... Houston, Texas  
Jack Meislin, M.D. .... Montrose, N. Y.  
Arpad Pauncz, M.D. .... Downey, Ill.  
Carl Haven Young, Ed.D. .... Los Angeles, Calif.

**EDITORIAL STAFF**

**EDITOR**

Roger H. Wessel  
Box 478, Montrose, N. Y.

**EDITOR EMERITUS**

Everett M. Sanders  
So. Sudbury, Mass.

**ASSOCIATE EDITORS**

Marthann Doolittle  
Thomas J. Fleming  
J. Robert Macaluso

**CONTRIBUTING EDITORS**

Ernst Jakl, M.D., Lexington, Ky.  
Peter V. Karpovich, M.D., Springfield, Mass.  
C. H. McCloy, Ph.D., Iowa City, Iowa  
Marcus Stewart, M.D., Memphis, Tenn.  
Dana M. Street, M.D., Memphis, Tenn.  
Raymond A. Weiss, Ph.D., New York, N. Y.

**DEPARTMENT EDITORS**

**BOOK REVIEWS AND ABSTRACTS**

Philip J. Rasch, Ph.D.

**CHAPTERS**

Charles Castle

**PRODUCTION EDITOR**

Harold McCormick

**CIRCULATION MANAGERS**

Edward Mecchella William Kultzow

**ADVERTISING MANAGER**

John J. Marquette  
Box 478, Montrose, N. Y.

**SUBSCRIPTION RATES**

Subscription to the Journal is included in Active,  
Professional, and Associate memberships.

Subscriptions to libraries and organizations \$5.00

Foreign \$5.50

Single Copies \$1.00

Address all requests for subscriptions to:  
Edward F. Mecchella, Circulation Manager,  
Box 478, Montrose, N. Y.

Copyright 1957 by the Association for  
Physical and Mental Rehabilitation

**ARTICLES**

- The Regulation of Muscular Strength - Erich A.  
Müller, M. D. .... 41
- The Application of Measurement to Quadriceps Exercise  
Prescription - David H. Clarke, B.S., M.S. .... 48
- Social Dancing as a Therapeutic Medium with Long Term  
Neuropsychiatric Patients - George Jurcisin .... 51
- The Child Amputee - Nathan Farber, M. S. .... 56
- Trends in the Treatment of Neuropsychiatric Patients with  
Tranquilizing Drugs - Henry A. Brandt, M. D. .... 58

**DEPARTMENTS**

- FROM OTHER JOURNALS ..... 62
- EDITORIALS ..... 64
- BOOK REVIEWS ..... 65
- CHAPTER ACTIVITIES ..... 68
- NEWS AND COMMENTS ..... 69
- CLASSIFIED DIRECTORY ..... Back Cover

# THE JOURNAL OF THE ASSOCIATION FOR PHYSICAL AND MENTAL REHABILITATION

## Information For Contributors

**MANUSCRIPT:** Manuscripts should not exceed ten (10) typewritten pages; approximately 5,000 words. Manuscripts must be the original copy, not a carbon, typed double-spaced with margins of one (1) inch for large type and one and a half (1½) inches for the small.

**STYLE:** Prepare manuscripts in conformity with the general style of the Journal. Retain a copy of the manuscript and duplicates of all tables, figures, charts for future use should originals be lost in the mails.

**ILLUSTRATIONS:** Drawings and charts should be made with India ink for photographic reproduction as zinc etchings. Photographs must be 8 x 10 inches, high contrast, black and white, glossy prints. Printed captions and related information referring to photographs, must be typed and attached to the bottom of the photograph. In accepting an article for publication the association agrees to defray the costs of one (1) photo engraving or line cut used for illustration purposes. Cost of additional engravings will be charged to the author.

**REFERENCES:** References in the text, should be in the form of footnotes, numbered consecutively throughout the manuscript. Additional references for collateral reading should be assembled alphabetically by author at the end of the article. This requires, in order, name of author, title of article, name of periodical or book, volume, page, month and year. For example: Morton Dudley J., *The Human Foot*, Columbia University Press, 1953. Kraus, Hans, M.D., "Therapeutic Exercises in Rehabilitation," *Journal of Physical and Mental Rehabilitation*, Vol. 3, pp. 7-10, June, 1959.

Send all manuscripts to the Editor, Box 178, Montrose, N. Y.

**REPRINTS:** Should be ordered when manuscript is submitted. They may be purchased at the following prices:

| No<br>Pages | 100     | 200     | 300     | 400     | 500     | 1000    | 100<br>Add. |
|-------------|---------|---------|---------|---------|---------|---------|-------------|
| 1           | \$ 6.50 | \$ 7.75 | \$ 8.75 | \$ 9.75 | \$10.75 | \$15.00 | \$ .75      |
| 2           | 9.25    | 10.50   | 11.75   | 13.00   | 14.25   | 19.75   | 1.00        |
| 3 - 4       | 11.75   | 13.50   | 15.25   | 17.00   | 18.50   | 26.00   | 1.50        |
| 5 - 8       | 22.50   | 25.75   | 29.00   | 32.25   | 35.50   | 48.75   | 3.00        |
| 9 - 10      | 28.50   | 30.50   | 35.50   | 40.50   | 45.50   | 65.00   | 4.00        |

## REPRESENTATIVE ASSEMBLY

### Area I

Leo Berner, 218-02 67th Ave., Bayside, N.Y.  
Kenneth Denning, 228 Wyman Rd., North Abington, Mass.  
George Hees, Box 256, Astor Station, Boston 23, Mass.

### Area II

Chris Kopf 2015 Birch St., Scotch Plains, N.J.  
Michael Yarosh, VAH, Wilkes-Barre, Pa.  
Thomas Zwierlein, 43 Shelter Lane, Levittown, Pa.

### Area III

Willis Denny, 104 Duncan St., Dublin, Ga.  
Charles Ishmael, VAH, Coral Gables, Fla.  
Robert McIntyre, VAH, Salisbury, N.C.

### Area IV

Roland Gagnon, 211 W. Humiston, Pontiac, Ill.  
Leslie Root, 2142 N. 61st St., Wauwatosa 13, Wisc.  
Robert Shelton, Univ. of Illinois, Urbana, Ill.

### Area V

Edgar Gay, VAH, Topeka, Kansas.  
M. Raymond Robinson, VAH, Jefferson Barracks, Mo.  
Ernest A. Wilbur, 4733 Miles Drive, New Orleans 22, La.

### Area VI

Evangelio Gerontinos, 1781 Begen Ave., Mountain View, Calif.  
David Portillo, VAH, Brentwood, Calif.  
Burr Zachary, 2527 Washington Ave., Santa Monica, Calif.  
*Speaker of the House*—Chris Kopf  
*Secretary*—M. Raymond Robinson

## OFFICERS

|  |                          |
|--|--------------------------|
| ARTHUR LANDY .....                             | PRESIDENT                |
| 47 No. Oak St., Kingston, Ohio                 |                          |
| JOHN E. DAVIS, Sc.D. ....                      | PRESIDENT-ELECT          |
| 105 St. Lawrence St., Rehoboth Beach, Delaware |                          |
| ELEANOR B. STONE .....                         | VICE-PRESIDENT           |
| 2451 Webb Ave., University Hgts 68, N. Y.      |                          |
| KARL K. KLEIN .....                            | VICE-PRESIDENT           |
| 1500 East 34th St., Austin 2, Texas            |                          |
| GEORGE NASH .....                              | VICE-PRESIDENT           |
| 7820 W. Wright, Wauwatosa 13, Wisc.            |                          |
| LESTER P. BURROWES .....                       | SECRETARY                |
| Box 12, Clinton, Miss.                         |                          |
| RAYMOND B. HEASLET .....                       | TREASURER                |
| 74 The Downs, Tuscaloosa, Ala.                 |                          |
| ROGER H. WESSEL .....                          | DIRECTOR OF PUBLICATIONS |
| Box 478, Montrose, N. Y.                       |                          |
| FRANK S. DEYOE .....                           | PAST PRESIDENT           |
| 87 Elm St., Saxonville, Mass.                  |                          |

## ADVISORY BOARD

FRANK S. DEYOE, Secretary

|   |                     |
|---|---------------------|
| JOHN H. ALDES, M.D. ....                  | Los Angeles, Calif. |
| RUFUS ALLDREDGE, M.D. ....                | New Orleans, La.    |
| THOMAS K. CURETON, Ph.D. ....             | Urbana, Ill.        |
| TEMPLE FAY, M.D. ....                     | Philadelphia, Pa.   |
| EVERILL FOWLKS, M.D. ....                 | Portland, Ore.      |
| RICHARD V. FREEMAN, M.D. ....             | Los Angeles, Calif. |
| FRITZ FRIEDLAND, M.D. ....                | Boston, Mass.       |
| EDWARD GREENWOOD, M.D. ....               | Topeka, Kans.       |
| HAROLD M. HILDRETH, Ph.D. ....            | Arlington, Va.      |
| A. B. C. KNUDSON, M.D. ....               | Washington, D. C.   |
| MELVIN J. MAAS, Maj. Gen. USMCR Ret. .... | Washington, D. C.   |
| C. H. McCLOY, Ph.D. ....                  | Iowa City, Ia.      |
| ROSS T. MCINTYRE, M.D. ....               | Coronado, Calif.    |
| KARL MENNINGER, M.D. ....                 | Topeka, Kans.       |
| DONALD MUNRO, M.D. ....                   | Boston, Mass.       |
| LOUIS B. NEWMAN, M.D. ....                | Chicago, Ill.       |
| WINTHROP M. PHELPS, M.D. ....             | Baltimore, Md.      |
| JOSEPHINE L. RATHBONE, Ph.D. ....         | New York, N. Y.     |
| JACOB L. RUDD, M.D. ....                  | Boston, Mass.       |
| ARTHUR STEINDLER, M.D. ....               | Iowa City, Iowa     |
| HARVEY J. TOMPKINS, M.D. ....             | New York, N. Y.     |
| JOSEPH H. VAN SCHOICK .....               | Washington, D. C.   |

## COMMITTEES AND CHAIRMEN

COORDINATOR: Dr. John E. Davis

STANDING COMMITTEES: AWARDS: George V. Devins; CHAPTERS: Charles E. Castle; CONSTITUTION: Willis P. Denny; MEMBERSHIP: Eleanor B. Stone; NOMINATING: Louis Fishbune; PROFESSIONAL STANDARDS: Karl K. Klein, Ernest Wilbur, Carl H. Young; RECRUITMENT AND PLACEMENT: Robert L. Davis; PUBLIC RELATIONS: George Nash; CONFERENCE: Norman H. Tenner.

ADMINISTRATIVE COMMITTEES: ADVERTISING: John J. Marquette; BROCHURE: Kenneth Denning; EMBLEMS: Frank Dignan; EXHIBIT: Hyman Wettstein; HISTORIAN: Frank Marusak; LEGISLATIVE: David Bilowit; LIAISON: Vincent M. Andersen; RESEARCH: Earl Mason; SCHOLARSHIP: Arthur S. Tauber; SURVEY: Paul Fleer; CERTIFICATION: Thomas J. Fleming; POSITION STANDARDS: Leo Berner.

AUXILIARY SERVICES: AREA CONSULTANTS: On Call from National Headquarters; LEGAL: DiBenedetto and Goldstein, New York, N. Y.

# THE REGULATION OF MUSCULAR STRENGTH

ERICH A. MÜLLER, M. D.\*

## Introduction

When our investigations on the physiology of muscular strength and training were first undertaken, little knowledge was available, either from experimentation or from practical experience in this field. Little attention had been given to problems such as whether common muscular strength is an equilibrium between activity and inactivity, whether it is regulated by inherent conditions and whether it is possible to alter the regulated level of strength. An excellent review of the last half century of research in this field was given by Steinhaus<sup>1</sup> in this *Journal* in 1955. What was clearly established by the work of Petow and Siebert (1925)<sup>2</sup> and Siebert (1928)<sup>3</sup> is the fact that nothing but an increase in intensity of work above that previously demanded of a muscle is the stimulus for an increase of muscular strength. But an answer for the fundamental question, how strong, how long, and how often this stimulus must operate to get an increase of strength and how weak or how seldom, on the other hand, in order to get an atrophic decrease, was never investigated.

*The advantage of using static contractions for the measuring and training of muscular strength.*

All our training was done with isometric static contractions for the following reasons:

1. The maximal strength possible in a certain position during a movement is much lower than the strength in the same position reached with a static contraction.
2. Due to the influence of mass and speed it is not possible to get strictly isotonic contractions in man, except with very low speed. It is therefore difficult to determine the identity of the stimulus exerted on the muscle fibres during dynamic training.

It is even more difficult to measure strength and its increase or decrease by measuring maximal dynamic work. Maximal dynamic work depends as much on the blood supply to a muscle as on muscular strength. Whereas maximal work increases roughly proportionally to muscular strength, it rises in a hyperbolic curve with a steady increase in blood supply. As we know from the work of A. V. Hill<sup>4</sup>, maximal work is more-or-less influenced by the speed of movement. Such diffi-

\*Professor of Physiology, Max-Planck Institute für Arbeitsphysiologie, Dortmund, Germany.



Fig. 1 Apparatus for static training of right and left forearm flexors and extensors in a rectangular elbow position.

<sup>1</sup>Steinhaus, A. H., "Strength from Mörpurg to Müller—a Half Century of Research," *Journal of the Assn. for Physical and Mental Rehabilitation*, 9:5:147-150, Sept., 1955.

<sup>2</sup>Petow, H. and Siebert, W., "Studien über Arbeitshypertrophie des Muskels," *Z. klin. Med.* 102:427-433, 1925.

<sup>3</sup>Siebert, W., "Untersuchungen über Hypertrophie des Skelettmuskels," *Klin. Med.* 109:350-359, 1928.

<sup>4</sup>Hill, A. V., "The Heat of Shortening and the Dynamic Constants of Muscle," *Proc. Royal Soc. B* 126:136-195, 1938.

culties have to date obscured and confounded interpretations of results from training experiments with dynamic work whereas training with isometric static contractions has permitted the drawing of valid conclusions.

#### *Dynamometry*

We used types of dynamometers, usually heavy springs, that were extended no more than a couple of millimeters, enlarged sufficiently on a scale that permitted readings with an error no greater than 5%. These dynamometers served for both training and the measuring of maximal strength. For training, the subject had to contract according to a given pattern, e.g. a prescribed number of kgs. for a prescribed number of seconds. In measuring maximal strength the subject had to make one short maximal contraction. The maximal position on the scale was recorded automatically for later reading.

It is very important in dynamometric studies that the position of the subject be fixed in an exactly duplicable way for each reading in a series that may extend over months, and that the equipment be adaptable to the size of different persons. One of our dynamometers is pictured in Fig. 1. This is the one we used for the flexors and extensors of the forearm. It can be adjusted to height and to length of the forearm and upper arm and permits the observer to reproduce exactly the same position of the subject in each experiment. The forearm is held horizontally at right angles to the upper arm.

A strong contraction is the stimulus which makes a muscle increase its mass, its cross-section and its strength. It obviously makes no difference whether the contraction happens at home, at work, or in a gymnasium; whether one contracts muscles with the special aim to increase muscular strength, or just casually. In order to determine the relation between muscular activity and increase or decrease in strength, one should, therefore, be able to control all activities of a person. The stimulus given on the dynamometer is therefore not the only one responsible for the observed training. All of the other uncontrolled contractions made in the course of the day should be added. This cannot be done. We experimented on members of our staff and on a number of students and asked them merely to avoid excessive work with the muscles that we were observing. To get quantitative and reliable results under such conditions seems at first impossible. It will, however, become clear why the daily activities did little or nothing to disturb the results.

*The threshold of muscular tension necessary to get a training effect (Hettinger and Muller<sup>5</sup>)*

In normal life muscular strength usually holds at a constant level. This means obviously that our daily

activities do not act as a training stimulus—at least not beyond that of maintaining our strength. In the first series of experiments the subject made one single static contraction daily with each arm, the right arm at one fraction of maximal strength, and the left to another, e.g. the right arm to 1/3, the left arm to 2/3. We call this the training strength. Once a week the maximal strength was measured, and the training strength adjusted progressively to the increasing maximal strength in order to keep the fraction of 1/3, 2/3, etc. We found that the training stimulus need not be a contraction of maximal strength. In fact, 2/3 of maximal has the same training effect whereas 1/3 or less is not effective. The threshold lies between 3/10 and 4/10 of maximal.

It is difficult to determine the threshold with greater exactness since the lower the fraction of maximal strength that is used for training, the more it equals the strength used in daily life. One has also to consider that the determination of the maximal strength once a week itself acts, as will be shown later, as a training stimulus sufficient to increase muscular strength. At present we can at least be sure that about 40% of the maximal strength does enough to get the quickest possible training effect.

The next series of experiments dealt with the question as to whether a longer sustained contraction, especially one sustained until complete exhaustion, would lead to a greater training speed. This involves the question of whether or not highly anaerobic conditions and the accompanying accumulation of metabolites are a necessary accessory stimulus for the increase of muscular strength during training. In this series we found that the increase of strength gained in the course of several weeks by one daily contraction is not influenced by the length of contraction time. Even the shortest contraction of more than 40% of maximal strength has a maximal effect. Fatigue and exhaustion do not influence the training effect. This has been confirmed by further experiments of Hettinger<sup>6</sup> that compared the training effect of the same training strength under conditions of good and poor blood supply.

The third series of experiments pursued the question of what happens if more or less than one contraction per day is performed for training. The answer is given in Fig. 2 where the speed of increase in strength is shown as a function of the interval between two training contractions. The intervals were varied from a fortnight down to fractions of a day.

<sup>5</sup>Hettinger, Th. and Muller, E. A., "Muskelleistung und Muskeltraining," *Arbeitsphysiologie* 15:111-126, 1953.

<sup>6</sup>Hettinger, Th., "Der Einfluss der Muskeldurchblutung beim Muskeltraining auf den Trainingserfolg," *Internat. Z. angew. Physiol. einschl. Arbeitsphysiol.* 16:95-98, 1955.



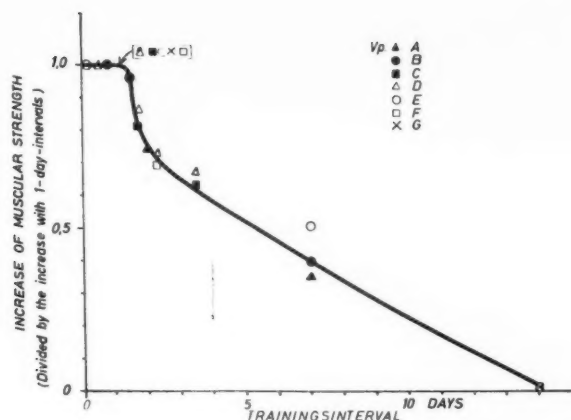


Fig. 2 Increase of muscular strength in relation to the interval between two training contractions.

Correspondingly, the frequency of the training stimulus ranged from one every 14 days to 7 per day. One can see that more than one contraction per day gives no better results than just one per day. Contracting a muscle less often than once a day, on the other hand, reduces the speed of increase in strength. After an interval of 14 days no increase in strength is detectable. This is due to the course of increase and decrease of strength. Following a single contraction strength rises at the highest rate of speed during the day and then more slowly from day to day for seven days. Thereafter in the days of the second week it drops back to its initial value. That is why after two weeks no effect is found.

Summarizing the results reported thus far, one can say that there is no better way to increase muscular strength than one short, about half-maximal, isometric contraction once a day. Contracting the muscle for a longer time, more strongly or oftener does not improve the resulting increase in strength. In ordinary practice one would not use a half-maximal but a maximal contraction. This has three advantages:

1. One needs no dynamometer to measure the training strength. It can be exerted against any resistance at hand.
2. The training stimulus increases progressively with the increase in strength.
3. If a dynamometer is used each maximal training contraction is at once also a measurement of maximal strength.

The application of these findings permits large savings in training time and apparatus. They will permit the strengthening of muscles without burdening metabolic, respiratory and circulatory functions since a short one-second contraction does not increase these functions appreciably.

#### Discussion of possible errors

We are now able to assess the errors that could be introduced in our experiments by the training effect of uncontrolled contractions in daily life. If a man keeps his daily activities nearly constant before and during training experiments, one can be sure that from this stimulus his maximal muscular strength has about three times the force exerted in his daily activities. No further training stimulus is to be expected from the latter. If perchance during a training experiment force applied in daily life surpasses the normal limits, it would not influence the course of daily training with maximal strength since a second contraction does not increase the training effect. Only if submaximal training strength is used or if the training stimulus is not given each day could a quicker increase of strength follow from super-normal uncontrolled contractions of the subject's routine activities of daily life. But this increase would disappear in a fortnight if the surpassing stimulus were not constantly repeated.

#### Cross training

Several authors have claimed that training muscles of one side of the body has a marked influence on the muscular strength of the other. (Hellebrandt, Parrish and Houtz<sup>7</sup>; Slater-Hammel<sup>8</sup>; Darcus and Salter<sup>9</sup>). We never observed such an effect in our experiments. Even the most marked increases in muscular strength of the trained muscle were absolutely one-sided. What could be the reason for this striking difference? The main reason for this difference may be found in the fact that all the authors who found cross-over training effects have measured strength by judging maximal dynamic work whereas we took a maximal static contraction as the measure of strength. It is obvious that taking maximal dynamic work over several seconds as an index of strength involves not only the strength of muscles but also the blood supply, as already mentioned. Since training itself was also done by long-lasting dynamic work and not, as in our case, by a single static contraction, there are good reasons to believe that the training had worked on heart and circulation as well. An increased power of the circulation to supply muscles with blood obviously helps the muscles of both sides and even the other muscles such as the abdominals.

There is another explanation for the reported results with cross training. In order to compare the ex-

<sup>7</sup>Hellebrandt, F. A., Parrish, A. M. and Houtz, S. J., "The Influence of Unilateral Exercise on the Contralateral Limb," *Arch. of Physical Med.* 28:76-85, Feb., 1957.

<sup>8</sup>Slater-Hammel, D. T. *Research Quarterly* 21:203, 1950.

<sup>9</sup>Darcus, H. D. and Salter, N., "The Effect of Repeated Muscular Exertion on Muscle Strength," *J. of Physiology*, 129:325-336, 1955.

tremities of both sides of the body before and after training, one measures the maximal strength at the beginning and at intervals during the course of training. If one trains only one side but controls the results on both sides, this control of maximal work is in itself a training stimulus. Before we were able to verify this fact, we were ourselves misinterpreting our results.

A third, but probably less likely, reason might be that doing dynamic work involves a much more complicated pattern of innervation than a mere static contraction. Different parts of muscles have to contract one after the other during shortening, with changing force adjusted to the changing resistance. That means "nervous learning" and we know that such "nervous learning" does cross over. (Hellebrandt<sup>10</sup>, Vetter and Muller<sup>11</sup>)

Practical experience also does not support the cross training theory. Why should an unused limb or a lesser used limb lose strength and mass if the parallel limb has a normal or even abnormal strength as is usually the case in patients with a one-sided inactivity, e.g. in amputees?

#### *The threshold of muscular tension necessary to avoid atrophy*

It is well known that absolute inactivity of a muscle is followed by atrophy, i.e. a loss of mass and strength. We investigated if this loss occurs at the same rate of speed as the loss observed following the close of training period. (Muller and Hettinger<sup>12</sup>) We put one arm in plaster and kept it inactive for periods from one day to one week. This procedure should give the maximal speed of loss in strength by atrophy. We found that the loss of strength in strict inactivity is at least four times as rapid as the loss from a trained muscle after the end of training. Since one cannot be sure that all static contractions inside the plaster cast are avoided, the actual speed might even be greater. We can therefore say that the conditions in an atrophic muscle are different in principle from those in a trained muscle. It is not the same state at two different levels of strength. This is confirmed by the fact that the speed of regaining strength after a period of inactivity and atrophy is also about four times the speed of the increase in strength in training a normal muscle.

The next step was to measure the threshold of the stimulus necessary to prevent atrophy. This was done by Hettinger<sup>13</sup> who made a cast of plaster for the forearm and divided it into two halves which were screwed together (Fig. 3). The cast was opened once a day carefully avoiding any load by gravity on the flexors and extensors. The elbow joint axis was brought in a vertical position and one contraction of



**Fig. 3 Removable plaster cast on arm.**

1/5, 1/10, 1/20 etc. of the maximal strength was exerted. The arm was put back in the cast again. It could be shown that a contraction equal to 1/5 of maximal strength once per day was just sufficient to prevent atrophy, 1/20 was equal to full inactivity while fractions between had atrophical effects of various speed.

#### *Definition of normal strength*

The stimulus of any muscular contraction has therefore two different effects: the one prevents atrophy, the other induces increase in strength. These effects have different thresholds. The maximal effect of one is reached with a contraction of 20% of the maximal strength, the other with a contraction of 35% of the maximal strength. Stimuli between the 20% and the 35% do not induce training yet they are sufficient to prevent atrophy. The maximal strength that we found when stimuli did not exceed these limits we designated as normal strength. The two stimulating effects of a contraction differ according to the speed of their action as already shown. They differ also in the frequency necessary to make them effective. We found that the training effect is secured even by one contraction per week. The atrophy-preventing effect, however, needs more frequent contractions per week. We are now trying to determine this frequency. Finally, the atrophy-preventing effect persists in older people whereas the training effect is lost.

Further proof for the existence of a normal

<sup>10</sup>Hellebrandt, F. A., "Ipsilateral and Contralateral Effects of Unimanual Training," *J. Appl. Physiol.* 129:325-336, 1955.

<sup>11</sup>Vetter, K. and Muller, E. A. "Die Verbesserung der Geschicklichkeit durch Uebung," *Arbeitsphysiologie* 15:264-272, 1954.

<sup>12</sup>Muller, E. A. and Hettinger, Th., "Ueber Unterschiede der Trainingsgeschwindigkeit atrophierter und normaler Muskeln," *Arbeitsphysiologie*, 15:223-230, 1953.

<sup>13</sup>Hettinger, Th., "Untersuchungen zur Bestimmung der Muskel-Atrophieschwelle," *Internat. Z. angew. Physiol. einschl. Arbeitsphysiologie* 16:52-56, 1955.

strength is given by the distribution curve of the strength of a group of 56 men and 58 women (Fig. 4). 80% of the men have a flexor-torque on the forearm in a right angle position in the narrow range

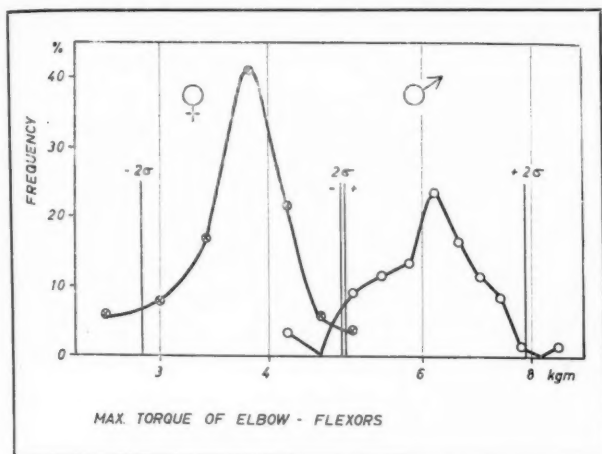


Fig. 4 Distribution of the strength in men and women.

from 5.5 to 6.7 k.g.; 80% of the women from 3.5 to 4.6 k.g. There is a different maximum for each sex and practically no overlapping of the curves.

#### Increase of normal strength

We mentioned above that strength which was increased by daily training is lost in about the same time that was required to build it up. We know, however, from experience that strength gained in youth by over-normal activity persists for life even when activity no more surpasses normal limits. To reconcile these divergent findings the following experiments are condensed in Fig. 5. Curve A shows the increase in

strength of a person trained with daily contractions of maximal strength. Strength is doubled in 20 weeks and lost after the end of training in 30 weeks. In Curve B, which belongs to the same person, daily training lasted merely 11 weeks. Strength increased during this time 66% of 6% per week. Training was then continued for another 12 weeks with only one maximal static contraction per week. The slow drop of strength following the end of training in Curve B compared with the quick fall in Curve A is very striking. To avoid any training effect from the testing for maximal strength, these measurements were taken at long intervals of several weeks.

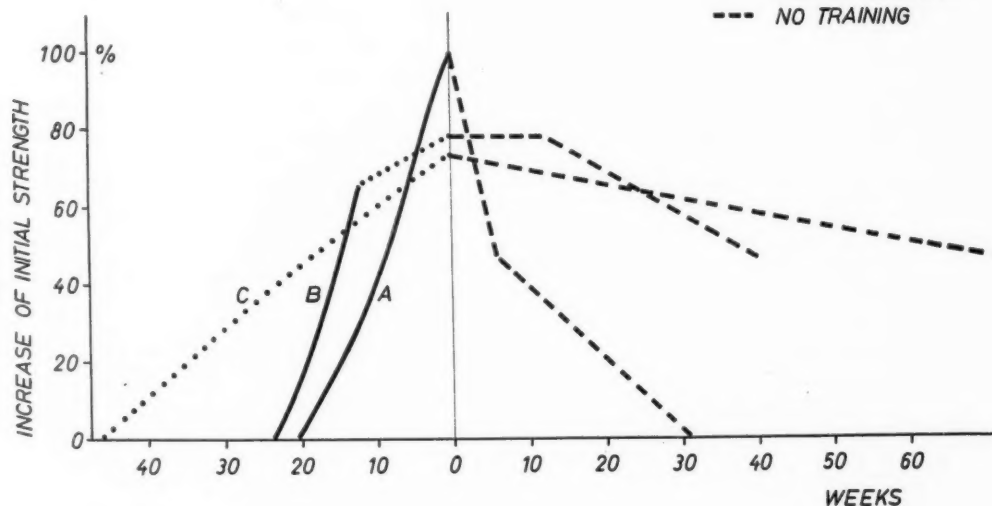
Curve C gives the average results of an experiment where training with one maximal static contraction per week was done on 11 different muscle groups of another person. They increased in strength 72% in 46 weeks, i.e. 1.6% per week. The fall of strength after the end of training is again very slow. 70 weeks after the end of training it is still 42% higher than before the beginning of training.

We have already established in unpublished experiments that fortnightly training after daily training maintains an increased level of muscular strength for longer than one year. It looks like a permanent increase of the normal strength. We don't know yet the reason for this fixation of strength gained by slow training.

#### Training and nutrition

One could ask, why does not every muscle keep a constant strength big enough for the necessary activities of the individual? Why has selection developed the possibility of training? One could try to answer these questions in the light of our results.

FIG. 5  
Loss and fixation  
of increased  
muscular strength  
according to  
different training  
intervals.



It seems that nature has very carefully provided for reducing muscular mass to as little as possible. This is seen in the sparing of muscle mass on children, on women, in sparing it during winter. It is also seen in the quick drop of mass after the end of intensive daily training. Only if again and again muscles are forced to strong contractions for months does the body allow a lasting increase of muscle substance. The only good reason for this economic principle is obviously the fact that muscles are made of protein, and need a daily intake of protein to maintain it. The 30 k.g. muscles of a normal man ask for about the same amount of meat to be eaten in a year. The correlation between basal metabolism and biceps strength was  $+0.79 \pm 0.04$  in a group of 56 men and 58 women between 16 and 50 years of age.

Experiments aimed to enlighten the relation between muscular strength and protein intake have been done by Kraut and Muller<sup>14</sup>, Kraut, Muller and Muller-Wecker<sup>15</sup>. Summarizing their work, one can say that the eating of plenty of meat in order to assimilate muscular substance is only necessary for a man after a long period of insufficient protein intake. Under such conditions other organs, the big glands, the heart and the brain have first rights on the protein. They take most of the protein given after starvation, not leaving much for an increase in muscular strength. In a state of normal and sufficient food intake with enough protein however, there is so much protein stored in the body that an increase in muscular tissue by training is possible without any protein intake over the normal rate of 1 gram per k.g. per day. Special experiments have shown that the training effect cannot be speeded up by increasing the protein intake over the normal limits under normal conditions. As little as 0.8 grams of protein per k.g. per day when only 14% is of animal origin stop any training effect (Kraut, Muller and Muller-Wecker—unpublished). Intake of sufficient protein is therefore a necessary condition but not a stimulus necessary to prevent atrophy nor to allow training.

It is possible that besides protein other factors in nutrition influence training—e.g. vitamins. The annual variation of the training effect showing a maximum in August-September and a minimum in January is possibly due to this influence (Hettinger and Muller<sup>16</sup>). It could, however, be due as well to a more direct influence of ultraviolet radiation (Hettinger and Seidl<sup>17</sup>).

#### Sex and age in training

The strength and trainability of muscles depends on other factors. Sex and age have a marked influence, as several authors have shown. (Ufland<sup>18</sup>, Schochrin<sup>19</sup>). As far as strength is concerned, the difference between sexes varies with the muscle group

tested. The selection of man as the stronger, fighting individual compared with the weaker woman charged with bearing and nursing the young does not concern all muscles equally. Ufland found a very small difference (about 20%) in the chewing muscles, whereas the strength relation of men to women for the biceps group was 1:0.5.

Women's muscles answer to training stimuli less than do those of men. Training a group of men and women changed the strength relation from 1:0.6 to about 1:0.5 in experiments of Hettinger<sup>20</sup>. Whereas sex differences in strength and trainability are correlated in middle aged people, this is not the case in older people. It is well known that strength does not drop with age, the gift however to increase strength by training is lost in the course of aging.

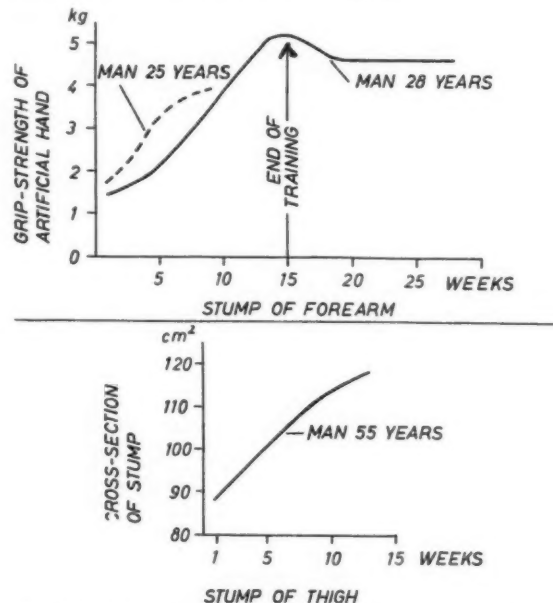


Fig. 6 Training of atrophic forearm and thigh stumps.

#### Static work training in rehabilitation

In a few cases we trained patients with one single static contraction per day to see if our findings

<sup>14</sup>Kraut, H. and Muller, E. A., "Muskelkraft und Eiweissration," *Biochem. Z.* 320:302-315, 1950.

<sup>15</sup>Kraut, H., Muller, E. A. and Muller-Wecker, H., "Die Abhängigkeit des Muskeltrainings und des Eiweissantes von der Eiweissaufnahme und von Eiweissbestand des Körpers," *Biochem. Z.* 324:280-294, 1953.

<sup>16</sup>Hettinger, Th. and Muller, E. A., "Die Trainierbarkeit der Muskulatur im jahreszeitlichen Verlauf," *Internat. Z. angew. Physiol. einschl. Arbeitsphysiol.* 16:90-94, 1955.

<sup>17</sup>Hettinger, Th., and Seidl, E., "Ultraviolettbestrahlung und Trainierbarkeit der Muskulatur," *Internat. Z. angew. Physiol. einschl. Arbeitsphysiol.* 16:177-183, 1956.

<sup>18</sup>Ufland, J. M., "Einfluss des Lebensalters, Geschlechts, der Konstitution und des Berufs auf die Kraft verschiedener Muskelgruppen," *Arbeitsphysiologie.* 7:232-237, 1934.

<sup>19</sup>Schochrin, W. A., "Die Muskelkraft der Beuger und Streck-er des Unterschenkels," *Arbeitsphysiologie.* 8:251-260, 1935.

<sup>20</sup>Hettinger, Th., "Muskelkraft und Muskeltraining bei Frauen und Männern," *Arbeitsphysiologie.* 15:201-206, 1953.



on normal persons were applicable in rehabilitation. (Muller and Hettinger<sup>21</sup>; Hettinger<sup>22</sup>). Two patients had lost one hand. They were fitted with artificial hands (Huffer-Hand), where supination on the forearm closed the hand between thumb and forefinger. Fig. 6 shows the increase in strength following one 2/3 maximal contraction per day. Fig. 5 in its lower curve shows the increase in stump cross-section of a thigh which was trained by static contractions against a circular compressing air pressure of 100 m.m. Hg. Noack<sup>23</sup> had great success regaining strength of the abdominal muscles of women after childbirth by contracting them against a suitable resistance.

There are several great advantages of static training compared with dynamic training in rehabilitation:

1. Much money and time is saved. One contraction per day or even one week can be done at home in many cases. There is no need to drive to a center to spend time there and to use the time of others.
2. No fatigue is necessarily involved in training muscles since one single contraction does not lead to fatigue.
3. In diseases where metabolic rate has to be kept low (diabetes), muscular atrophy due to little activity can easily be prevented by static training.
4. Heart and circulation are not stressed by static training. Atrophy is therefore unnecessary in heart cases.

#### *Static training and endurance*

Hettinger and Muller<sup>24</sup> found that the time which a static contraction with given strength can be held until exhaustion remains unaltered in spite of an increased maximal strength of 64% to 97%. This means that in spite of a lower tension (strength per cross-

section) blood supply is not remarkably better. One cannot deduce any knowledge on vascularization from these findings since blood supply and endurance in static work are mainly a function of the uninterrupted compression of blood vessels (Muller<sup>25</sup>; Barcroft and Swan<sup>26</sup>). One should know the maximal endurance of a trained muscle for prolonged dynamic work in order to learn about the relation between improvement of increased strength and vascularization. It is not yet clear if static and dynamic training have a different effect on vascularization. A better vascularization might follow other laws than the ones found improving strength.

A strong muscle, however, does not mean better performance in practice whether in sports or in daily work. Skill and an appropriate adaptation of ventilation and circulation to the increased muscular power must be acquired by other ways than by static muscular training. Our results do not claim to cover more than one page of the book to be written about the training of all physiological functions.

In preparing this review in English I am grateful for the valuable help of Professor Arthur H. Steinhaus of George Williams College, Chicago, Ill.

<sup>21</sup>Muller, E. A. and Hettinger, Th., "Ein einfaches Trainingsverfahren für Stumpfmuskeln," *Z. f. Orthopädie*, 83: 617-619, 1953.

<sup>22</sup>Hettinger, Th., "Die Wiederherstellung der Funktionstüchtigkeit atrophiierter Muskulatur," *Munch. Med. Wochschr.* 26:724-726, 1953.

<sup>23</sup>Noack, H., "Gynakologische Gesichtspunkte zur Entwicklung des Frauensportes," *Dtsch. Med. Journal*, 17:615-622, 1956.

<sup>24</sup>Hettinger, Th. and Muller, E. A., "Muskelleistung und Muskeltraining," *Arbeitsphysiologie*, 15:111-126, 1953.

<sup>25</sup>Muller, E. A., "Das Arbeitsmaximum bei statischer Haltearbeit," *Arbeitsphysiologie*, 5:605-612, 1932.

<sup>26</sup>Barcroft, H. and Swain, H. J. C., *Sympathetic Control of Human Blood Vessels*. London: E. Arnold u. Co. 1952.

## AMERICAN BOARD FOR CERTIFICATION OF CORRECTIVE THERAPISTS

### Registry of Certified Corrective Therapists

Through error the following names were not included on the registry list which appeared in the Jan.-Feb. issue of the Journal. The persons whose names appear below are all certified members in good standing:

#### **Maryland**

William F. Capallo

#### **Oregon**

William G. Kelly, Jr.

#### **New York**

Perry Gilbert

#### **Mississippi**

John M. Hawk

#### **Texas**

J. R. Green

Ernest E. Raines

# THE APPLICATION OF MEASUREMENT TO QUADRICEPS EXERCISE PRESCRIPTIONS

DAVID H. CLARKE, B. S., M. S.\*

## Introduction

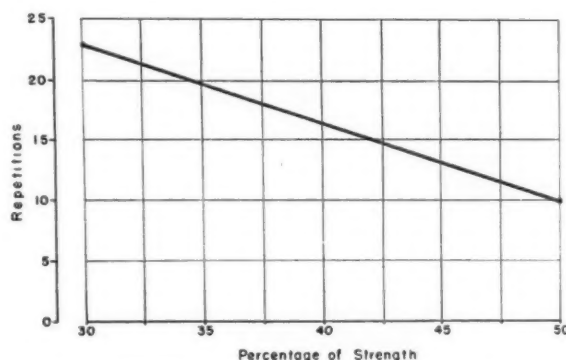
It is generally recognized that the technique of exercise prescription most often employed in the development of muscular strength is the method proposed by DeLorme.<sup>1</sup> Based upon the use of ten repetitions maximum (R.M.), this series of three exercise bouts has been employed extensively in the field of rehabilitation for increasing strength of various muscle groups. The initial bout of this series is set at one-half of the amount required for ten repetitions maximum; the second bout is equal to three-fourths of the ten repetitions maximum; and the final bout is the amount of weight that can be moved successfully through the range of motion for just ten repetitions. The post-World War II era has seen an ever-increasing emphasis upon the application of strength-producing activities to specific disabilities and this is being carried out today in civilian and military hospitals throughout the country and in many foreign lands.

With this increased emphasis has come an enlargement of treatment facilities and the expansion of training programs, with more effective patient treatment resulting through the improvement of therapeutic techniques. As these procedures are utilized, however, new concepts are formulated and problems analyzed. One of these problems, recognized by many therapists, involves the application of DeLorme's system of progressive resistance exercises.

From its description, the key to DeLorme's method lies in the determination of the ten R.M. The main problem confronting therapists and technicians utilizing this system has been how to arrive at this level quickly and accurately. The most common method has been by trial and error, and in many instances valuable treatment time has been lost. Two previous studies of quadriceps exercises have attempted to objectify this procedure, one reported by Klein and Johnson<sup>2</sup> and the other by Clarke and Herman.<sup>3</sup> The former stated that their subjects could usually produce a knee extension exercise bout of ten repetitions maximum when the resistance load was five pounds less than the amount of weight they could lift on a single effort. It is noted that this method is depend-

ent upon the subjective judgment of the therapist to determine this one R.M.

Clarke and Herman, on the other hand, first studied the strength of the quadriceps in knee extension by measurements with a cable tensiometer. From their data various percentages of the strength were converted to pounds and equivalent weights were placed on a quadriceps "boot." The subject then performed as many repetitions as possible. The percentages utilized were 30, 35, 40, 45 and 50. On the basis of the number of repetitions produced at each percentage, it was concluded that a resistance load equal to 50 percent was a reasonably satisfactory method of determining the amount of weight necessary for ten repetitions maximum.



Mean Repetition Curves in Quadriceps Development Exercises at Various Percentages of Strength.

The purpose of the present research is to expand upon the Clarke-Herman study in order to establish an alternate method, one in which the strength-testing tensiometer is not needed, for the determination of the maximum resistance load for ten repetitions of the quadriceps muscle group.

<sup>1</sup>DeLorme, T. L., *Progressive Resistive Exercise*, New York: Appleton Century Crofts, Inc., 1950.

<sup>2</sup>Klein, K. K. and Johnson, E., "Research: A Method of Determining the Maximum Load for Ten Repetitions in Progressive Exercise for Quadriceps Hypertrophy," *Journal of the Association of Physical and Mental Rehabilitation*, 3:1:81-89, February, 1950.

<sup>3</sup>Clarke, D. H. and Herman, E. L., "Objective Determination of Resistance Load for Ten Repetitions Maximum for Quadriceps Development," *Research Quarterly*, 26:4, 385-390, December, 1955.

\*Lt. MSC, Department of Surgery, Brooke Army Hospital, Fort Sam Houston, Texas.

### Assumptions

The experimental procedures in this research were based up the study by Clarke and Herman. The results of their testing showed that nearly a straight line decrease in the mean number of knee extension repetitions resulted when the weights used varied from 30 to 50 percent of the strength of the quadriceps. It is assumed for the purpose of this study that a relationship exists between the percentage of this muscle group and the number of repetitions performed utilizing knee extension exercises, as represented by Fig. 1, and that a resistance load equal to 50 percent of the strength of the muscles tested best represents the amount of weight necessary for ten repetitions maximum.

### Subjects

The subjects utilized in this research were U. S. Army personnel. In all, 28 subjects were utilized, selected upon their complete willingness to cooperate in each phase of the experiment. The majority of these men were physical reconditioning technicians, and nearly half were former college physical education majors. With this activity background, they were probably physically superior to the general population.

### Testing technique

The knee extension testing technique in this research, utilizing the quadriceps "boot" and weight plates, was identical with the procedure utilized in the previously reported study by Clarke and Herman. This method is described as follows:

(a) The subject assumed a sitting, backward-leaning position with arms extended to rear, hands grasping sides of table. A pad was placed under the knee joint for better positioning and comfort.

(b) A specially constructed quadriceps "boot" was employed which consisted of a leather convalescent shoe riveted to a regulation iron boot with an iron bar passing through the center of this at instep level. Calibrated iron plates, appropriate for each subject, were placed on the bar.

(c) No warm-up bouts were permitted. The subject's exercise was confined to an alternate concentric and eccentric contraction of the extensors of the knee with complete extension required on each movement.

(d) The subjects were instructed to continue this exercise for as many repetitions as possible; that is, until they reached the point where they failed to gain complete extension. Emphasis was placed, in particular, upon the following two factors: (1) lowering the weights in a smooth and even manner; (2) reducing the underswing of the weights to a minimum.

### Experimental Procedures

Two resistive exercise bouts were administered to the subjects, each on different weeks. For the first exercise period, the subject was given any weight that he could manage, selected arbitrarily, and was instructed to perform as many complete repetitions as possible. From this data the amount of weight was calculated that corresponded to the 50 percent level of strength, as shown in Fig. 1. This 50 percent proportionate weight was utilized in the second bout where the subject again performed his maximum number of repetitions. The technical steps for calculating this weight were as follows:

1. By utilizing the graph in Fig. 1, the percentage of total strength was determined by locating the point on the curve that corresponded with the number of repetitions performed in exercise bout 1.
2. A ratio was then established utilizing: a) the amount of weight lifted in bout 1; b) the percentage of strength that this represented in Fig. 1; and c) the standard figure of .50, which represented the 50 percent level of strength. The following equation best represents the type of computation utilized:

$$\frac{\text{Amount of weight lifted}}{\text{Percentage of strength}} = \frac{X \text{ weight}}{.50}$$

or

$$X \text{ weight} = \frac{\text{Amount of weight lifted} \times .50}{\text{Percentage of strength}}$$

Thus, subject A, given 60 pounds to lift on his first bout, performed eighteen complete repetitions. Consulting Fig. 1, 18 repetitions represents 37.50 percent (.375) of total strength, and applying the formula:

$$X \text{ weight} = \frac{60 \times .50}{.375} = \frac{30.0}{.375} \text{ or } 80 \text{ lbs.}$$

3. For subjects who performed repetitions in excess of the number included in Fig. 1, the line was extended to the left and values for number of repetitions and percentage of strength were proportionately adjusted. For ease of reference, a chart giving the correct percentages relative to the number of repetitions performed appears in Table 1.

### Results

The results of the testing are as follows:

1. Mean repetitions in bout 2 when the weights utilized were corrected to the 50 percent level of strength were 10.69. The mean calculated in the Clarke-Herman study was 10.43.

| <i>Repetitions<br/>Performed</i> | <i>Percentage<br/>of Strength</i> | <i>Repetitions<br/>Performed</i> | <i>Percentage<br/>of Strength</i> |
|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|
| 10                               | 50.00                             | 21                               | 32.75                             |
| 11                               | 48.50                             | 22                               | 31.25                             |
| 12                               | 47.00                             | 23                               | 29.50                             |
| 13                               | 45.25                             | 24                               | 28.00                             |
| 14                               | 43.75                             | 25                               | 26.25                             |
| 15                               | 42.25                             | 26                               | 24.75                             |
| 16                               | 40.50                             | 27                               | 23.25                             |
| 17                               | 39.00                             | 28                               | 21.75                             |
| 18                               | 37.50                             | 29                               | 20.20                             |
| 19                               | 35.75                             | 30                               | 18.50                             |
| 20                               | 34.25                             |                                  |                                   |

**TABLE 1**  
**Strength Percentage Values for Repetitions Performed**

2. The range of scores in this second bout was between 0 and 16 repetitions (one subject was unable to gain a single complete extension). The standard deviation, calculated from ungrouped scores,<sup>4</sup> was 3.03 repetitions. Thus under normal conditions, ap-

proximately 68 percent of the scores would fall between 7.66 and 13.72 repetitions, utilizing this procedure. The standard deviation in the Clarke-Herman study was 2.32.

#### *Summary and conclusions*

In this study 28 subjects were given two knee extension exercise bouts. The first utilized any random weight, while the second was based upon these results, the exact weight being calculated from previous research data. On the basis of the number of repetitions produced in the second exercise period, the technique utilized was found applicable for determining the amount of weight necessary for ten repetitions maximum in quadriceps exercise.

<sup>4</sup>Garrett, H. E., *Statistics in Psychology and Education*, 3rd edition, New York: Longmans, Green and Co. 6; 62-63, 1947.



YOU ARE CORDIALLY INVITED TO ATTEND

## Eleventh Annual Scientific and Clinical Conference

### The Association for Physical and Mental Rehabilitation

IN CONJUNCTION WITH  
AMERICAN ASSOCIATION OF REHABILITATION THERAPISTS  
ASSOCIATION OF MEDICAL REHABILITATION DIRECTORS AND COORDINATORS

**CHICAGO JULY 7-12, 1957**

**THE CONRAD HILTON**

AN OUTSTANDING PROGRAM OF  
LECTURES, DEMONSTRATIONS  
AND PANEL DISCUSSIONS BY  
NATIONALLY KNOWN AUTHORITIES

OF PARTICULAR INTEREST TO:

- PHYSICIANS • NURSES • ADMINISTRATORS
- CORRECTIVE, EDUCATIONAL AND MANUAL ARTS THERAPISTS • PHYSICAL EDUCATORS



# SOCIAL DANCING AS A THERAPEUTIC MEDIUM WITH LONG TERM NEUROPSYCHIATRIC PATIENTS

GEORGE JURCISIN\*

## Introduction

From time immemorial dancing in one form or another has been a prominent feature of the culture of a people. Originating, and still practiced among primitive tribes as religious ritual, dancing evolved both as an interpretive art form and as a medium for social activity between the sexes. In our own society, social dancing has attained a unique position in this latter respect, particularly among young people of high school and college age.

For teen-age gatherings whether the situation be a formal prom or an impromptu party, dancing is the primary activity, the milieu through which boys and girls can relate with each other in an acceptable pattern. As Gregson states, social dancing is one way "a couple can 'let off steam' in a creative dance experience that releases pent-up energy, affords a physical workout and thus is a great satisfaction to the participants."<sup>1</sup> Since Man is by nature gregarious, it would appear that those individuals who do not or cannot participate in this ubiquitous activity would be considerably affected by this fact—not to conform, or as the expression has it, "to be a wall-flower"—is a type of rejection all too commonly experienced in connection with such functions.

Specifically, the present study is primarily concerned with treatment of selected patients at the Veterans Administration Hospital, Chillicothe, Ohio. From a survey of 42 clinical folders, an hypothesis was suggested that the opportunity to relate socially with the opposite sex had been suppressed at sometime during the growing-up process. It was found that most of these patients were not included in the regular social dance parties. In most cases the patient who has privileges (not on locked ward), usually attends and participates actively in these dances. However, the locked ward patient who has been ill for a long period of time and has shied away from social activities, may attend these dances but only as a spectator. No one has taken the time and effort to teach him the basic steps necessary to dance properly. However, this lack of instruction may be due in part to a shortage of personnel. This fact alone may be a good reason why some long term mentally sick patients do not receive

adequate treatment. The short term mentally ill patients are usually given more attention since chances of possible recovery are greater than in the long term patients.

In most cases these long term patients prefer to sit on the hospital ward and may resist any attempts to encourage them to attend the hospital dances. As the patient sits by himself, he has a tendency to increase his preoccupation and lessen the chance for making a better hospital adjustment or complete recovery. Jenkins<sup>2</sup> has pointed out that the schizophrenic's preoccupation with unresolved conflicts interferes with higher levels of the mind from functioning. He further emphasizes, "The reversal of the schizophrenic process through the drawing of the higher brain structures into the service of day-to-day adjustment is illustrated in spontaneous recovery which originates in the development of interest, motivation, and adaptive behavior in occupational therapy, manual arts therapy, corrective therapy, or music therapy."<sup>3</sup>

The writer, having had previous social dance teaching experience as a corrective therapist, was particularly interested in utilizing social dance techniques with long term neuropsychiatric patients. These patients may well have had suppressing type influences during their lives which prevent normal social relations with the opposite sex.

Social dance should aid the patient in making a better social adjustment than an activity which is not related to community life. If the male patient is in need of understanding and responding to a woman properly, it would seem that turning the shoulder wheel, hitting the punching bag, and riding the exercise in the corrective therapy clinic, would not be conducive in fulfilling these specific needs. The therapeutic medium should have specific relevance to the required goal of therapy. The above activities are better suited for achieving other therapeutic effects.

In a previous study, Flaherty, Rasch, Rankin, and DePalma<sup>4</sup> stated that "Music and dance might aid in arousing the patient's interest and participation in a pleasurable aesthetic activity associated with normal

\*Certified Corrective Therapist, V.A. Hospital, Chillicothe, Ohio.

<sup>1</sup>Gregson, Nancy, *Social Dance and Related Social Skills*, M. A. Thesis, Ohio State University, 1948, p. 10.

<sup>2</sup>Jenkins, Richard L., "Suturing The Schizophrenic Split," M. A. Thesis, Ohio State University, 1948, p. 10. January, 1955.

life." In this regard, Marion Chace<sup>4</sup> declared that "Dance Therapy, in making use of the basic form of communication, offers the individual a means of relating himself to the environment or to other people when he is cut off in the majority of areas by the patterns of his illness."

Because of these and other opinions, it was decided to evaluate the use of social dance as a means of therapy. A study was made to determine how participation in fox trots and waltzes could effect the subsequent behavior of those mentally ill.

#### *Selection of Patients*

Twelve long term neuropsychiatric patients, consisting of six in the experimental group and six in the control group, were selected for this study. This choice allowed the writer to employ social dancing as a means of resocializing the so-called hopeless patient without the use of any further supportive therapy. The experimental group participated actively in the dance while the control group did not.

In addition to the long term nature of the patient's illness, the following criteria were established as a means of selecting subjects for this study: Overprotection or rejection by parents or relatives; little or no dating of the opposite sex; social isolation in childhood; and unhealthy sex education.

These criteria were decided upon only after due consideration of a pilot study's results, the critical reading of clinical histories, and hospital staff notes. The six control and six experimental patients were then matched as closely as possible in relation to these above criteria.

#### *Establishing Rating Scales (Chart I)*

Long term neuropsychiatric patients who have been inhibited in their social relationships lack certain social skills, values, and understandings that are necessary for adequate adjustments to life situations. The writer feels that social dance offers these patients an excellent opportunity for learning social skills, understanding and values. The following hypotheses were made:

1. Social dancing overcomes the patient's inferiority.
2. Social dancing stimulates social mixing.
3. Social dancing reduces anti-social habits.

Six rating scales were devised as a means of attempting to measure whether the above propositions were true or false. Each scale had five descriptive statements which were rated on a one to five continuum, for scoring purposes.

Scale No. I measured the degree of inferiority. This degree of inferiority was numbered from 1 ("Feels very inferior") to 5 ("Little or no inferiority").

Scale No. II measured the frequency of cutting-in (one of the techniques used in the clinic). This scale was rated only in the dance clinic and then at a ward dance party to compare the control group with the experimental group. "Cutting-in" freely, being the highest level of achievement, was placed on top of the scale while "Refusing to cut-in" was placed on the lower end of the scale. This change of degree in measurement of Scales No. I and II was included to caution the observer to think about each behavior characteristic rather than to be merely mechanical in his judgment.

Scale No. III measured the degree of "approaching the volunteer" in the dance situation. This characteristic was rated only in the dance clinic and then at a ward dance party. This enabled the author to compare the control group with the experimental group. The reader will note that in the appraisal scheme the highest level of achievement "approaching the volunteer spontaneously" was placed on top of the scale, while "refusing to dance with anyone," was placed on the lower end of the scale.

Scale No. IV measures the degree of "social mixing" with the highest level of achievement being "mixes with everyone." The lowest level of achievement "mixes with nobody" was placed on the bottom of the scale.

Scale No. V. measures the degree of "Grooming."

Scale No. VI measures the degree of "Aggressiveness."

#### *Observations*

Observers rating the patients according to these scales consisted of hospital personnel who came in daily contact with the patients. They included psychiatrists, nurses, therapists, psychiatric aides, volunteers, etc. A minimum of five and a maximum of nine observers were present during most of the study. They were oriented in appraising the patients on an impartial basis and were requested to read each scale carefully for clarity. It might be added that for the most part these same observers were present throughout the fourteen weeks of this study.

During the study, the experimental and control groups were observed on the hospital ward before the dance class began, during and after the dance class, and at a ward dance party.

#### *Volunteers*

Female volunteers were selected for the study to

<sup>4</sup>Flaherty, B., Rasch, P. J., Rankin, C., DePalma, J., "The Role of Therapeutic Dancing In a Corrective Therapy Program," *The Journal of the Association for Physical and Mental Rehabilitation*, 4:1:11-13, August-September, 1950.  
<sup>5</sup>Chace, Marion, "Dance As Adjunctive Therapy," *Bulletin of The Menninger Clinic*, Topeka, Kansas, 17:225, 1953.

# Chart I. RATING SCALE

Patient's Name ..... Observer's Name .....

| Rating Scale No. I Inferiority (Check One Box Only)            | Score                       |
|--|-----------------------------|
| Feels very inferior—needs constant encouragement .....         | 1. <input type="checkbox"/> |
| Feels inferior but responds finally to encouragement .....     | 2. <input type="checkbox"/> |
| Sometimes will respond to motivation; sometimes won't .....    | 3. <input type="checkbox"/> |
| Feels some inferiority—needs minimal encouragement .....       | 4. <input type="checkbox"/> |
| Little or no inferiority—has full confidence in self .....     | 5. <input type="checkbox"/> |
| <b>Rating Scale No. II Cutting In (Check One Box Only)</b>     |                             |
| Cuts in freely .....   | 5. <input type="checkbox"/> |
| Cuts in most of the time .....                                 | 4. <input type="checkbox"/> |
| Cuts in several times .....                                    | 3. <input type="checkbox"/> |
| Cuts in only once .....  | 2. <input type="checkbox"/> |
| Refuses to cut in .....  | 1. <input type="checkbox"/> |
| <b>Rating Scale No. III Approaching Volunteer (Check One)</b>  |                             |
| Approaches volunteer spontaneously .....                       | 5. <input type="checkbox"/> |
| Hesitates—then finally approaches vol. spontaneously .....     | 4. <input type="checkbox"/> |
| Sometimes will—will not approach volunteer .....               | 3. <input type="checkbox"/> |
| Approaches vol. when motivated by writer or vol. ....          | 2. <input type="checkbox"/> |
| Refuses to dance with anyone .....                             | 1. <input type="checkbox"/> |
| <b>Rating Scale No. IV Social Mixing (Check One Box Only)</b>  |                             |
| Mixes freely with everyone .....                               | 5. <input type="checkbox"/> |
| Mixes freely with almost everyone .....                        | 4. <input type="checkbox"/> |
| Mixes freely with several persons .....                        | 3. <input type="checkbox"/> |
| Mixes freely with one person only .....                        | 2. <input type="checkbox"/> |
| Mixes with nobody .....  | 1. <input type="checkbox"/> |
| <b>Rating Scale No. V Grooming (Check One Box Only)</b>        |                             |
| Very poorly groomed—dress, hair, and shoes messy .....         | 1. <input type="checkbox"/> |
| Poorly groomed—sloppily dressed .....                          | 2. <input type="checkbox"/> |
| Neatly dressed—hair combed, some grooming .....                | 3. <input type="checkbox"/> |
| Fairly well groomed—neat in appearance and dress .....         | 4. <input type="checkbox"/> |
| Well groomed—well dressed, hair combed, face clean .....       | 5. <input type="checkbox"/> |
| <b>Rating Scale No. VI Aggressiveness (Check One Box)</b>      |                             |
| Rarely aggressive toward people or property .....              | 5. <input type="checkbox"/> |
| Occasionally aggressive toward either people or property ..... | 4. <input type="checkbox"/> |
| Occasionally aggressive toward people and property .....       | 3. <input type="checkbox"/> |
| Often aggressive toward either people or property .....        | 2. <input type="checkbox"/> |
| Often aggressive toward people and property .....              | 1. <input type="checkbox"/> |

make the dance class as socialable as possible. These ladies were local citizens who volunteered their time and effort for the good of the patients and without remuneration.

No definite volunteer was assigned to any patient. The writer felt that it would be unwise to run the risk of two or three patients monopolizing one volunteer. Altercations between patients might develop.

It is believed that volunteers can play an important role in overcoming the sensitivity of a patient in a predominantly male neuropsychiatric hospital where normal social relations with members of the opposite sex are limited.

In regard to sexual impulses or compulsions toward female personnel, the author feels that the patient may be behaving in this matter merely to gain female attention. He may have had little chance before this time to satisfy his need for affection and companionship in a proper setting. The author believes that if the environment is controlled, the patient may overcome his anti-social behavior. However, if he persists in his abnormal behavior, the patient is informed that misconduct will prevent him from attending the class.

## Grouping Patients For The Study

Since only six at most, and often times only four, female volunteers were available to serve as dancing

partners, individual attention was limited to a small group of patients. If large groups were used, relatively few patients would have dancing partners at any given moment. In addition, changes in personnel and other class assignments influenced small groups.

#### *Duration of the Study*

The experimental group met for one hour once a week in the corrective therapy clinic for a total of nine weeks. Ten weeks was originally allotted, but a previous commitment prevented the class from meeting between the eighth and ninth week. This permitted the author to observe any after-effects of social dance for the following week. An interruption of this nature may be a traumatic experience to the patient, and he may regress to his former level of behavior. On the other hand, the opposite might hold true.

#### *Selection of Evaluating Instrument*

In looking about for an appropriate instrument to evaluate the scores of the experimental and control groups, the author selected the Fisher t Test. This test was chosen because it is a method of challenging the null hypothesis in research studies utilizing small samples.

#### *Actual Dance Class Procedures*

During the first week of dancing, as the male patients entered the corrective therapy clinic, the female volunteers were at first introduced to them in an informal manner. The proper method of introduction was then explained to the members of the class while soft music was playing on the phonograph. Carefully selected fox trot records with slow tempo were used to avoid exciting the patients. During this beginning phase, the patients became aware of the beat and rhythm of fox trot music. This enabled them to become familiar with the music and movements which would be used in learning the beginning box step.

The writer then had the class form a circle with volunteers and patients interspersed. The prime intent of this technique was to orient the group to the objectiveness of the dance class. These objectives were as follows: To relax the body through rhythmic body movements; help each other learn to dance; have fun with others; understand the proper relations between men and women; and to be aware of one's personal appearance and grooming. Even this kind of orientation tends to serve as an "ice breaker." It reduces the patient's anxiety, and decreases his fears.

In the next teaching phase, the tempo of the fox trot was raised, and the author began clapping his hands and stamping his right foot to the accented beat. In some cases the hands of the patient were passively clapped, but he was encouraged to take an

active part by watching others and feeling the rhythm.

The next progression was to show the patient that social dancing is walking to music. Normal walking was then demonstrated with fox trot music, by moving the feet forward, backward, and sideways. These steps are used in the various dance patterns and are essential for beginning dancers.

The group was then arranged into a line, side by side, with the author, his back toward the patients, about four steps in front demonstrating the beginning box step. After the group practiced the box step in this manner, the patients were encouraged to ask a volunteer for a dance until the class ended.

In the remaining eight weeks of dance therapy, the patients' program included proper dance position with volunteers and patients interspersed; snake formation for resocialization; dance etiquette; mixers for selecting partners; question and answer periods regarding likes and dislikes of the program; initiating waltz rhythm with the box step; and review of all fundamentals and techniques employed.

Only the fox trot and waltz were stressed in this study since time did not permit the introduction of other dance steps. It is believed that progression has to be slow with these patients. Any attempt to hurry and add a wide variety of steps would have been confusing and defeated the purpose of the study.

#### *Results*

The analysis which follows was carried out noting important findings related to each behavior characteristic. For the purpose of this study zero to .10 level of significance was considered significant. Findings above the .10 level of significance approached a chance difference (difference between means), and may show important trends. The six scales employed were: I, Inferiority, II, Cutting-In, III, Approaching Volunteer, IV, Social Mixing, V, Grooming, and VI, Aggressiveness. (See Sample Graph I. Inferiority).

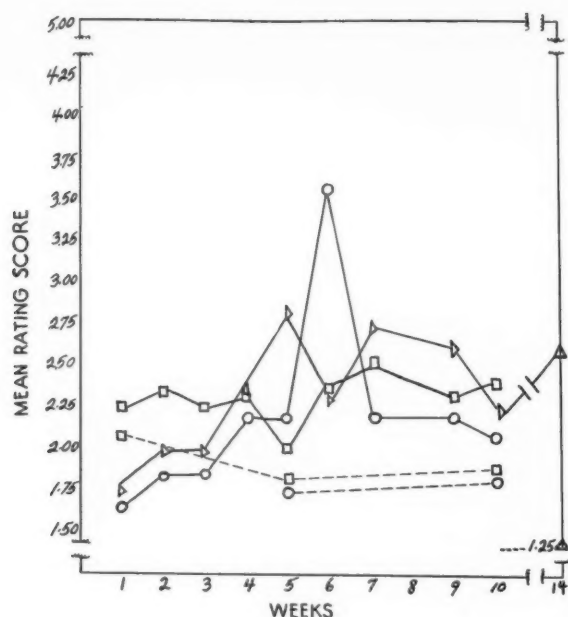
**Inferiority (Scale I Before Dance):** There was no significant change within the experimental group from start to the end of the study. Comparing the fifth to the tenth week, however, improvement was more noticeable in the experimental group, at the .20 level.

**Inferiority (Scale I During Dance):** In comparing the experimental and control groups during the last week ward dance, significant changes were made by the experimental group beyond the .01 level.

**Inferiority (Scale I After Dance):** Comparing the first to the fifth week, within the experimental group, significant changes were made at the .10 level.

**Cutting-In (Scale II During Dance Only):** During the fourteenth week ward dance party, the experimental group showed a significant difference from the control group at the .07 level.





GRAPH I

#### Mean Rating Scores of Inferiority Characteristics

Experimental and control group scores are plotted before (in squares), during (in triangles), and after dancing (in circles) at weekly intervals. Broken lines denote control group; solid lines, experimental group. No dance was held the eighth week, and the fourteenth week dance represents a month's lapse of time.

Approaching Volunteer (Scale III During Dance Only): When comparing the experimental group with the control group at the fourteenth week, it differed significantly at the .07 level, while the control group showed no change.

Social Mixing (Scale IV): The only significant changes were made during dance when comparing the first to the tenth week (.05 level), within the experimental group; and at the fourteenth week measurement between both groups (.01 level), in favor of the experimental group.

Grooming (Scale V): Significant changes were made by the experimental group at the .02 level before, during, and after dance, when comparing the experimental with the control group.

Aggressiveness (Scale VI): No appreciable difference was made between the control and experimental group. This was probably due to the fact that only a few patients showed aggressive behavior.

An interesting sidelight was, that of the six experimental patients, two, who were on trial visit, have

since been discharged. The third patient became more sociable on the ward and now participates in more ward activities. The fourth member was more relaxed on the ward and easier to manage. The fifth patient improved during the experiment, but when it was terminated, he had little opportunity to socialize with the opposite sex, due to a physical disability. The sixth patient's behavior vacillated on the ward, and, he made little improvement.

#### Conclusions

1. Evidence presented in this study tends to indicate that a nine weeks social dance experience assists in overcoming inferiority. As a result, socialization is improved.

2. Although the social dance experience was terminated, patients continued to participate in dancing at social functions at the hospital. They learned a new skill which assisted them in socializing in mixed groups. This indicates that social dance is an activity which aids the patient in making a better social adjustment than does an activity which is non-related to community life.

3. Highly significant changes were made by the experimental group in five behavior characteristics; namely, Inferiority, Cutting-In, Approaching Volunteer, Social Mixing, and Grooming.

4. No improvement was made in the degree of aggressiveness by either the control or experimental group.

5. The control-group made no significant improvement in any of the behavior characteristics measured throughout the study.

#### Summary

This medium of therapy as originally hypothesized, does bring about improvement as evaluated by Scales I to V (Inferiority, Cutting-In, Approaching Volunteer, Social Mixing, and Grooming. No improvement was evaluated from Scale VI (Aggressiveness).

#### Recommendations

Added research should be made in regard to the duration time of social dancing. It would be interesting to discover what effect a daily dosage of social dance for three months, six months, or one year would have on long term mentally ill patients. This added research should, furthermore, include the short term mentally ill patients, as well.

# THE CHILD AMPUTEE

NATHAN FARBER, M. S.\*

Scattered throughout the literature in periodicals of psychology, occupational and physical therapy, medicine and rehabilitation are numerous references to evaluation and treatment of child amputees. This paper will attempt to bring together contemporary thought on psychological aspects of the child amputee from theoretical and practical points of view.

Several writers have proposed theoretical explanations for the behavior of the handicapped individual. Barker et al.<sup>1</sup> and Cruickshank<sup>2</sup> have ably presented summaries of these various positions. Several theories seem to hold much promise in their attempts to explain the psychology of handicap. Schilder<sup>3</sup> proposed the body image theory which presumes that the awareness of one's own body is the most basic and immediate fact of mental life. Studies have shown that the more nearly self-perception of body image matches the perception held by others, the better adjusted that individual will be; and conversely, the less the self-perception agrees with others, the less well adjusted an individual will be. Adler<sup>4</sup> formulated a theory in which he proposed that a person exhibits a compensatory drive to be superior in order to overcome his handicap. Meng<sup>5</sup> has proposed a multi-faceted Freudian explanation. Lewinian Field Theory<sup>6</sup> has been proposed to explain the various mechanisms in operation in attempts at social adjustment by a handicapped individual.

During the four years of World War II there were 18,000 servicemen who lost limbs, while there were 120,000 civilians who lost limbs during this same period.<sup>7</sup> It can be estimated that one-third of the involved civilian population were children; thus approximately 10,000 children lose limbs each year. It can be further estimated that approximately one-fourth of these children are congenital amputees. The major proportion of traumatic amputees lose limbs in railway and auto accidents, explosions, gunshot wounds and other machinery accidents. The incidence of lower limb traumatic amputees in children rises sharply from the age of ten, possibly due to an increase in association with machinery and a decrease in maternal supervision from this age.

In adult traumatic amputees the phantom limb phenomena often creates a serious problem but with

children under ten or twelve years of age it has been found that this experience is not reported. Older children can conjure up a phantom limb, but this has not been found to be much of a problem.

While Barker and Cruickshank mention several psychological studies on crippled children the writer has been able to find only one study in the literature dealing exclusively with amputee children. Fishman's study<sup>8</sup>, although utilizing a small number of cases, is valuable as a pilot study in indicating trends and pointing up areas for further investigation.

Fishman's study covered four areas: (1) reaction to amputation, (2) parental attitudes, (3) social sensitivity and (4) general adjustment. Fishman found that the children studied reacted to their disability in a variety of ways, extending from withdrawal, shame and depression to self-acceptance, independence and compensatory manual skills. While parents of these amputees tended to accept their children less than in the average parent-child relationship there was further indication that the traumatic amputee was more accepted by his parents than the congenital amputee. This may possibly be due to parental feelings of guilt or shame in the latter cases. In general the amputee children were hypersensitive to their amputation and were relatively poorly adjusted when judged on the sensitivity and adjustment scales. On the other hand, there were indications that there was a differential in adjustment between the congenital vs. traumatic amputees, with the latter being more poorly adjusted than the former. This

\*Barker, R. G., Wright, Beatrice A., Gonick, Mollie R., *Adjustment to Physical Handicap and Illness: A Survey of the Social Psychology of Physique and Disability*. New York: Social Science Research Council, 1953 Revision, Bulletin 55.

<sup>2</sup>Cruickshank, W. M., "Psychological Considerations with Crippled Children" in Cruickshank, W. M. (ed.) *Psychology of Exceptional Children and Youth*. Englewood Cliffs, N. J.: Prentice-Hall, 1955.

<sup>3</sup>Schilder, P., *The Image and Appearance of the Human Body*. New York: International Universities Press, 1950.

<sup>4</sup>Adler, A., *A Study of Organ Inferiority and Its Physical Compensation: A Contribution to Clinical Medicine*. New York: Nervous and Mental Disease Publishing Co., 1917.

<sup>5</sup>Meng, H., "Zur Sozialpsychologie der Körperbeschädigten: Ein Beitrag zum Problem der praktischen Psychohygiene." *Schweizer Archiv für Neurologie und Psychiatrie*, 1938, 40, 328-344.

<sup>6</sup>Lewin, K., *Principles of Topological Psychology*. New York: McGraw-Hill Book Co., 1936.

<sup>7</sup>Kessler, H.H., "Psychological Preparation of the Amputee." *Indust. Med.*, 1951, 20, 107-108.

<sup>8</sup>Fishman, S., *A Survey of 23 Upper Extremity Child Amputees at the Mary Free Bed Hospital, Grand Rapids, Michigan*. New York: New York University, 1955.

\*Chief Psychologist, Rehabilitation Center For Children of the Children's Hospital and Crippled Children's Guild, 936 Delaware Ave., Buffalo 9, N. Y.

finding may be related to the body image theory, and it may be hypothesized that the poorer adjustment of the traumatic amputees is due to inability to accept their disabled status. Congenital amputees, having known no other situation, do not need to make the radical changes in self-concept which the traumatics must do in order to achieve adequate emotional adjustment.

Several other findings with regard to prosthesis seem to be different than those observed with adult amputees. Children seem to become better adjusted to their arm prostheses, often using them when their normal arms are unoccupied, and some children even take naps while wearing their appliances. These actions rarely occur in adult amputees.

One psychological technique which has been utilized fruitfully with adult amputees and which promises to be a useful tool in diagnostic testing with children is the drawing of the human figure by the child. Fishman used this with the children he studied but did not indicate what his results were, only giving interpretive data. Several studies with adult amputees indicate a variety of reactions in the drawing of the human figure. Some adults deny the amputation, others displace the amputation from the leg to the arm, or transpose it from the male to the female figure.

One study gives proof of the effectiveness in the successful use of arm prosthesis. Using adults, Geist<sup>1</sup> administered motor dexterity tests to normal and prosthetic groups and found no differences in performance in three of the four manual tests used.

Various authorities in the field of prosthetic application recommend early fitting of devices. It is not surprising to find the advocacy of fitting a child with a lower limb appliance at nine or ten months of age since this is reasonable in the light of what is known about the age at which normal children begin to pull themselves erect and learn to walk. With upper extremity fittings it has been found that children under four years of age cannot operate a mechanical functional device. Children under four years of age are usually fitted with a paddle affair or a device with an indentation to hold a milk bottle or a passive rubber mitten to allow crude bilateral prehension. Fitting a young child with upper extremity prosthesis will aid him in keeping his balance and will give him some security and protection when falling.

Many factors are involved in successfully training the amputee to use his prosthesis. Of primary importance is motivation, that is, the strong desire on the part of the amputee to make fullest use of the device. With motivation must come acceptance of the appliance since a prosthesis will only be used to the degree that it is felt to be a part of the body and

personality. With younger congenital amputees the problem is not as great as with those who have used their stump advantageously. The problem is still greater with the traumatic amputee who needs to accept the fact that his original extremity is irretrievably lost and that he must substitute the limited functions of the prosthesis in its place. The older traumatic amputee must be helped to realize in the initial stages of rehabilitation that he is obtaining a substitute with limited function, since a prosthesis cannot totally replace the original extremity.

At this Rehabilitation Center there is a great emphasis upon early diagnostic study and prosthetic application. Furthermore, we feel that it is not a case of fitting a child with either a functional upper extremity device or a non or semi-functional cosmetic arm. We feel that it is important for the child to have both devices, the former to obtain maximum bilateral functioning and the latter for social, cosmetic appearances. This obviates to a great extent the strong conflicts which parents have in seeing a hook prosthesis for the first time. Their immediate reaction is "I don't want my child wearing one of those things!" They turn deaf ears to the explanation of the functional advantage of a hook appliance. Similarly, as indicated above, adolescents strongly desire cosmetic appearance above functional use, and a duality does not create a need to make a choice. In a sense they may have their cake and eat it, too.

Several problems may arise when a child goes to school for the first time. It has been recommended that teachers be instructed in the philosophy and use of the prosthetic device. A demonstration of the skill, use and operation of the prosthesis by the child before his classmates is urged so that peer relationships might be facilitated, rather than having the child ridiculed and ostracized. In some instances this may have an enhancing effect, elevating the child in the esteem of his peers. The idea is that once the peers become familiar with, and understand, the device it will be accepted.

With adolescent amputees the problem of vocational guidance arises. Estimates by the Civil Service Commission have indicated that anywhere from 50 to 99 per cent of jobs are unavailable to those who have missing or partially missing extremities, varying from the loss of fingers to total amputation of one or both extremities. In order to achieve maximum adjustment of older amputees, vocational guidance must be an integral part of the rehabilitation process and program. With surgical amputation cases it may even

(Continued on Page 62)

<sup>1</sup>Geist, H., "The performance of amputees on motor dexterity tests," *Educ. Psychol. Measmt.*, 1949, 9, 165-772.

# TRENDS IN THE TREATMENT OF NEUROPSYCHIATRIC PATIENTS WITH TRANQUILIZING DRUGS\*

HENRY A. BRANDT, M. D.\*\*

The history of the usage of tranquilizing drugs actually dates back some thirty centuries to the usage of the magic snakeroot remedy by India's ancient medicine men. The root of the rauwolfia shrub (*Rauwolfia Serpentina*—a pink blossomed plant about two feet high with long, snake-like roots) was prescribed by the ancient healers for an amazing array of ailments. It was given for dysentery, cholera, headaches and fever. It was widely used for epilepsy, insanity, blindness and insomnia. It was the standard antidote for the bites of insects and snakes, and it was regularly given to infants to hush their crying. As the ancient, empirical medical practices of India slowly advanced and expanded, so also did the snakeroot legend, still subtly intermingled with magical belief. In many of these applications, the root gave no real benefits. But its modern-day successes in quieting the mentally ill, calming the neurotic, and aiding the hypertensive, the aged and others offer a striking justification for many of the medical practices and beliefs of old-time India.

Despite ancient belief in curative powers of snakeroot in India, nearly 2500 years passed before the Western World heard of it. Then, in the 16th Century, a German physician named Leonhard Rauwolf set out from his home in Augsburg to seek the medical wisdom of the Orient. His travels did not carry him through India, so it is a question whether he himself actually saw the plant which "cured madness." When the snakeroot plant did reach Europe some years later, the French botanist Plumier named it *Rauwolfia* in his honor, and today it is carrying his name around the world. Yet, skeptical European scientists still refused to believe in the legendary powers of rauwolfia. It was not the first such mistake. We once overlooked digitalis (an old housewife's recipe for dropsy) cocaine (used as a stimulant by the Peruvian Incas), and ephedrine (applied as "the yellow astringent" by Chinese physicians for 5000 years). Not until the 20th Century, after hundreds of thousands of Indian patients had been treated with rauwolfia root for numerous ailments, did a few careful Indian botanists and clinicians conduct convincingly

exhaustive tests on the plant and its powers. Soon after, scientists in Switzerland and the United States satisfied themselves that, while part of the rauwolfia legend was false, part was undoubtedly true. Only then was the ancient veil of mystery enshrouding the snakeroot sufficiently lifted to reveal the valuable drug.

In 1931, following the rise of modern science in India, Indian scientists isolated crystalline alkaloids from the rauwolfia roots. Rauwolfia therapy for mental disease and other ills then blossomed enormously, yet, beyond Asia, medical men still took little note. Finally, in 1949, the reports of the effectiveness of serpasil permeated Europe and the United States.

The isolation of the active component from the crude root was a tiny white crystal of pure reserpine with a complicated chemical molecule. Animal experimentation with the rhesus monkeys, who in their normal state are nervous and viciously antagonistic toward humans showed that reserpine made them calm and manageable. Yet, significantly, they did not suffer a loss of muscular coordination, as they did when given tranquilizing doses of other sedatives. Early in 1950, hospitals and medical centers all over the United States embarked on clinical studies of reserpine.

In 1952 the great French pharmaceutical house of Rhone Poulenc gave our laboratories chlorpromazine to work with, after extensive previous use of the drug in England and on the Continent. Finally in May of 1954 chlorpromazine was commercially introduced.

An outstanding American trait is characterized by the so-called "pendulum theory." Enthusiasm goes to one extreme and then to the other. The history of medicine and psychiatry follows this pendulum theory. Quite characteristically in this country when we do swing, we swing pretty far. We have had periods dominated by a psychological and analytic approach, and now periods in which the swing is very much toward a psychological approach. Today it is estimated that chlorpromazine alone has been administered to over seven million patients.

The remarkable parade of new drugs has changed the whole scope and aspect of neuropsychiatry in the past few years. In November 1954, it was demonstrated that some of the piperidyl compounds blocked the de

\*Presented at the Tenth Annual Conference, The Association for Physical and Mental Rehabilitation, Augusta, Ga., June, 1956.

\*\*Chief, Psychiatric Service, Veterans Administration Hospital, Augusta, Ga.



velopment of lysergic acid diethylamide (LSP-25) psychosis when given to normal subjects as premedication. Since then, alpha-(4-piperidyl) benzhydrol hydrochloride (*Frenquel*) has been found to exhibit definite though inconsistent therapeutic effects in schizophrenic dissociation syndromes.

The isomer of Frenquel, pipradol Hydrochloride (*Meratran*) has now been used as a central nervous system stimulant without concomitant effects on the autonomic nervous system. *Ritalin* (Ciba), a synthetic methyl ester of phenyl-(2-piperidyl) acetic acid is now used as a mild cortical stimulant.

Mephesisin (*Tolserol*) introduced in 1946 as a short acting muscular relaxant led to a dicarbamate derivative, generically named "meprobamate" (*Miltown* and *Equanil*), had long acting and pronounced muscular relaxant and potent anticonvulsant properties and also exerted a marked "taming" effect on monkeys.

Just how these drugs accomplish their enormously beneficial work is not yet precisely known. The available scientific evidence indicates that reserpine simply tranquilizes by acting on the brain stem—subcortically, probably on the hypothalamus—with minimum of soporific action as the cortex is not affected. Chlorpromazine also depresses the hypothalamic mechanism and particularly those situated in the posterior hypothalamus, the part of the brain in which are centered the patterns for emergency, for fight and flight. The depression of this part of the brain and the consequent toning down of emotional expression suggests a mechanism for the improvement of disturbed patients. The central effects of reserpine, including fall of body temperature, potentiation of somnolence, decrease of blood pressure and slowing of the heart, are chiefly due to depression of the sympathetic portion of the hypothalamus. Chlorpromazine, too, depressed the hypothalamic mechanisms, but unlike reserpine, chlorpromazine involves peripheral structures for the latter drug is sympatholytic, hence the hypotensive effects. It is also parasympatholytic, thus accounting for the rapid heart rate. With the depression of the hypothalamus affected by both drugs the anterior pituitary is deprived of hypothalamic support and changes in the endocrine balance occur so that nonpregnant women may lactate and disturbances of menses take place. The tranquilizing drugs also affect the activating system of the brain. This consists of the reticular formation of Magoun and Maruzzi and the diffuse thalamic projection of Jasper. Moderate amounts of chlorpromazine depress this system in such a way that they prevent the awakening, alerting or arousal reaction. This inhibition imparts to the action of chlorpromazine a sort of pharmacologic lobotomy. The patient still feels peripheral stimuli

but is less concerned with them. Reserpine, on the other hand, stimulates this system, thus explaining in part why the patients can take the drug and remain awake in the daytime, as the arousal reaction counteracts the sleep effect imposed by the hypothalamic depression.

Thus, reserpine and chlorpromazine are sedatives with the unique ability with proper dosage to selectively inhibit subcortical activity. They can thus serve as effective tranquilizing agents in many conditions without inducing either sleepiness or confusion. They are especially useful in the relief of psychotic excitement, autonomic agitation, anxiety, or related dysfunctions, but are contraindicated in most cases of apathetic or akinetic depression, and in neurasthenic or obsessive states. In excessive or protracted dosage, or in sensitive individuals, they induce Parkinsonian-like or even catatonic states, or so disturb autonomic balance as to bring on distressing or dangerous symptoms of nausea, diarrhea, fever, tachycardia, pruritis or dermatitides edema or vascular collapse. Liver damage and agranulocytosis are additional complications. Reserpine appears to be less toxic, though milder and less constant in action with vasomotor changes more severe.

The action of reserpine and chlorpromazine on deep-lying brain centers, serving to insulate an individual from the stresses and cares that weigh upon him, has produced dramatic results in various types of schizophrenia. The hebephrenic and catatonic patients appear to be helped most by reserpine. In paranoid patients chlorpromazine seems most beneficial. The schizo-affective patients have exhibited best improvement with chlorpromazine. These drugs have facilitated psychotherapy through physiologic relief of anxiety, tension, insomnia or somatic symptoms, thus aiding the therapist to establish rapport and encouraging the patient to remain in therapy.

Neither drug alleviates depression; reserpine may even potentiate depression, but chlorpromazine seems effective when the depressive state is accompanied by psychomotor agitation. Immediate treatment after hospitalization with adequate doses for sufficient periods is essential. Psychotherapy can be instituted when the blocking effect of anxiety is removed. Long term maintenance may be necessary in many cases.

Recently, Promazine Hydrochloride (*Sparine*), the unchlorinated chlorpromazine has been introduced with perhaps more adequate "taming effect" and less toxicity.

The safety of these drugs is exemplified by a 20 months old boy who accidentally ingested approximately 800 times the normal adult dose of reserpine.

He was quite groggy for about three days but suffered no permanent ill effects.

*Meprobamate* (*Miltown* and *Equanil*), the dicarbamate derivative of mephenesin (*Tolserol*) produces its effects by blocking abnormal stimuli in the long interneuronal circuits, especially those between the cortex, thalamus and hypothalamus. The action of the drug can be demonstrated at the level of the spinal cord but the most striking property of meprobamate is its selective action on the thalamus. It reduces psychic, as well as skeletal, muscular tension. Autonomic functions are not affected. The drug has been effective in psychoneurotic conditions, and it may well be that one of the physiologic expressions of psychoneurosis consists of reverberation of discharges in the complicated interneuronal system of the thalamus. Safety is again demonstrated by one patient who took 100 tablets (400 mg. each) at one time without injury.

*Frenquel* alpha (4-piperidyl) benzhydrol hydrochloride offers a new neuropharmacologic approach to certain acute psychotic states where delusions and hallucinations have been the primary symptoms. The mechanism of action is localized in higher brain centers, perhaps the mesodiencephalic activating system.

*Meratran*, alpha (2 piperidyl) benzhydrol hydrochloride, isomer of *Frenquel*, is a central nervous system stimulant without concomitant effects on the autonomic system. The site of action is in or around the hypothalamus, increasing the attention span, decreasing irritability, with a resultant increase in function. Therapeutically, the drug benefits reactive depressions, chronic fatigue, and narcolepsy. Klingman postulates the site of action to be the activating reticular system with effect on involuntary movements as blepharospasm, dystonia, torticollis, ballismus, choreic movements, trismus and conversion motor symptoms.

*Ritalin*, methyl-phenidylacetate hydrochloride, is a mild cortical stimulant indicated mainly to counteract oversedation and other unwanted side effects of drugs.

The clinician has always wondered whether schizophrenia was a disease entity or a reaction pattern due to many causes. Speculation has frequently been made as to the types of metabolic error which might be implicated in the production of these clinical disorders. Recently, considerable interest has been aroused in several theories which would attribute to a biochemical disturbance a significant role in the development and maintenance of schizophrenic reactions. Prominent among these is the indole theory, with the implication that these substances are capable of producing a hallucinatory state without disor-

ientation and of a schizophrenic rather than a delirious character.

A great forward step in the specific treatment and understanding of mental illness was made when it was discovered that lysergic acid diethylamide, or mescaline, will produce experimentally in man the approximate equivalent of schizophrenia. This mental dissociation is temporary and may be prevented or reversed by the administration of certain compounds of the piperidyl type (*Frenquel*).

It has been frequently stated that there is nothing new under the sun, only that which has been rediscovered. Drugs which contain an intoxicating principle were described by the Chinese in the fifteenth century before Christ. The Germans came to call them the "phantastica." More recently they have been labelled the "hallucinogens." A look at the major phantastica of vegetable origin reveals that an indole nucleus is common to their chemistry. They include lysergic acid diethylamide (LSD-25) from rye rust; yohimbine from the bark of the yohimbehoe tree; harmine from the Turkish plant, *peganum harnala*; and ibogaine from a bean grown by the Ibo Tribe of Central Africa, mescaline, from the mescal or peyote cactus of Aztec origin. The one exception to this rule about the indolic structure of hallucinogens is the oil from the flowering tops of the female hemp plant, cannabis, or marihuana, or bhang, or charas, or ganja, or hashish as it is called, depending on where you live on this earth.

There are a few hallucinogens of animal origin as well. In 1936 Nieuwenhuys found that tryptamine produced negativism and catalepsy in cats. Recently, Evarts has shown that Bufotenine, an extract of the skin of toads and lizards, produces ataxic motor disturbance, indifference to tactile stimuli, and what might be summed up as schizophrenic behavior. In February 1955, a physician undergoing a prostatectomy developed a confused state on the second post-operative day. He told of sensations of levitation, of visual and haptic hallucinations, of a feeling of drifting into a weird world dissociated from the real one and of his sensation of fear and foreboding which accompanied it. The similarity between his stream of talk and that of the LSD-25 and mescaline subjects was striking. Then he was given 59 mg. of *Frenquel* intravenously and urged to go on talking. He described the progressive amelioration of his dissociated mental state during the next half hour. "Pink adrenaline," or adrenochrome, was found to be the responsible agent and others have repeated the experiment with the drug and produced a harrowing temporary psychosis.

Minute dosages of these "hallucinogens" or "phantastics" produced a syndrome simulating a moderate acute schizophrenic upheaval of the turmoil or schizo-affective type with or without catatonic features. Other manifestations were disturbances of the thought processes and of perception, behavior, affect, and mood. Misinterpretations, hallucinations, and delusional experiences were frequent; suspiciousness and paranoid reactions were not uncommon. Depersonalization was an almost constant feature.

The known hallucinogens which produce a schizophrenic or pseudoschizophrenic state in man and in experimental animals are indoles or potential indoles, if we exclude cannabis. All of them act in minute quantities in man which suggests they exert their effects on enzyme systems concerned in brain metabolism.

Possible metabolic errors in the etiology of schizophrenia concern the faulty metabolism of tryptophan to tryptamine, an indole-ethylamine, which produces experimentally catalepsy and negativism in cats which persists for several days.

Another metabolic error which has received a great deal of attention concerns the fate of serotonin, the neurohormonal agent which has been found to be a normal constituent of brain tissue. Faulty metabolism produces methylserotonin, an indole which produces a schizophrenic-like state for several hours following minute injections. Bufotenine, the active indole principle of cohoba, is produced by a second methylation error in serotonin metabolism. The aboriginal men of Hispaniola and South America carried out an experiment for us with their ceremonial use of cohoba. Fra Ramon Pane, who came to America with Columbus on his second voyage, described in 1496 the ceremonial inhalation of cohoba to produce temporary dissociation states.

It is possible that the serotonin in our brains plays an essential part in keeping us sane, and that the effect of lysergic acid diethylamide (LSD-25) with the production of temporary madness is due to its inhibitory action on the serotonin in the brain.

Many have suspected that the key to the riddle of schizophrenia may be found in an error in epinephrine or adrenaline metabolism. Deteriorated adrenaline, (pink adrenaline) adrenochrome when injected in self-experiments in volunteers produced schizophrenic dissociations of as long as four days duration.

Perhaps all of these errors of metabolism may be operative in schizophrenia; on the other hand, none of them may be of etiologic importance. It has been speculated that the new pharmacologic agents which are demonstrating some therapeutic value in these patients might inhibit the effects of the faulty metabolites (hallucinogens) on phosphorylation or on

the citric acid cycle in glucose metabolism and thus correct a portion of the metabolic errors which may produce the schizophrenic reaction pattern.

We may be assured that a great deal of work will be done in this field in the days just ahead, and we may find a real ray of hope for a large and wretched group of sick people in this type of investigation.

It has been proposed that these new tranquilizing drugs be called *Ataraxics* (Ataraxy of Greek origin, meaning freedom from confusion or peace of mind). They do offer a hope of some peace of mind for the nine million mentally ill in the United States.

The optimum time to help mental patients is at the onset of the crisis—or at the time of hospital admission. During the first year of hospitalization, a mental patient's chances are 50-50 of ever getting out. After two years, the odds are 16-1 against him and after eight years, it is 99-1 that he will stay inside the remainder of his life. How the tranquilizing drugs will alter these figures remains to be seen. Many patients have been already changed from raging, combative, unsociable persons to cooperative, cheerful, sociable, relatively quiet persons who are amenable to psychotherapy and rehabilitative measures. The tranquilizing effects have really produced "a quieting of the waters" with many patients now willing to occupy themselves with simple pastimes and to take part in group activities. There has been dramatic improvement in some "hopeless" individuals in the chronic wards of mental hospitals from which few patients before had emerged to the world of health and reality.

The "pendulum theory" has produced a marked swing in our enthusiasm, and skeptics are needed to curb this enthusiasm. In 1840 a German psychiatrist named Neumann commented: "It is high time that we should cease the search for the herb or salt or metal which will cure mania, deterioration, delusions, or excitement. It will not be found any sooner than one will find pills which will make a great artist out of an ignorant lout, or a well-behaved child out of a spoiled one." The tranquilizing drugs are said to be beneficial in arthritis, ulcer, dermatoses, menopause, insomnia, drug addiction, alcoholism, burns, headache, hypertension, asthma, dysmenorrhea, tuberculosis, head injury, mental deficiency, nausea and vomiting, hiccup, pain, epilepsy, neuromuscular disorders as cerebral palsy, Huntington's Chorea, Syderham's Chorea, hemiballismus, and the neuroses and psychoses. Indeed, the tranquilizing drugs may be of some value as supplemental therapy in these multiple and varied disorders, but perhaps in our enthusiasm to swing with the pendulum we have danger of again



imitating the ancient "magical beliefs" offering a panacea for all the ills of the world. At best, these drugs are only additives to established medical treatment.

They do make the disturbed patient calmer, although still clear, and he thereby becomes accessible to many forms of psychotherapy: group psychotherapy, individual psychotherapy, any of the many and varied things of a rehabilitative or curative nature that go on in a hospital. These drugs must not be considered as miracle drugs or curative drugs but as

drugs that will give us the opportunity to open avenues for real psychotherapy for these persons who are in need of adjustment, who have been misdirected by their delusional impulses and experiences in the sense that they have created their own world of existence. These drugs have made innumerable acute and chronic patients more amenable to help and in this way have imposed a tremendous responsibility on all of us to aid them in their long and arduous journey to rehabilitation and mental health.

#### CHILD AMPUTEE—cont'd from p. 57

be advisable to begin vocational rehabilitation before surgery.

Little has been said of the role of parents in the total picture of the child amputee. They are extremely important aspect of the program. Parents should be helped to express their feelings of guilt, frustration and conflicts of doubt and misunderstanding regarding their role in the production of an amputee child. Often parent group counseling or individual therapy with a psychologist or other trained specialist is useful in helping parents to express and work through some of their feelings. Only by acceptance of the child as he is and accepting and approving of the prosthesis is there ever hope that a child will adjust to and functionally use the artificial appliance.

Much research is still needed in several cases concerning the child amputee. Very little is known about the reaction of normal children to child amputees. One presupposes that the prosthesis would make a good weapon in an altercation between an amputee child and a normal child. Preliminary investigation does not support this. Work is needed in the area of verification of psychological theory regarding the amputee child. Extensive and intensive personality appraisal of the amputee child and his reaction to normal children, adults, and prosthesis is needed. Still more needs to be done to understand the child amputee better so that the best of care and treatment may be offered to insure him his rightful place in society as a whole.

#### Additional References

- Abt, L. E., "Psychological adjustment of the amputee" in Klopsteg and Wilson *Human Limbs and Their Substitutes*, New York: McGraw-Hill, 1954.  
Noble, D., Price, D. B., and Gilder, R., "Psychiatric Disturbances Following Amputation." *Amer. J. Psychiat.*, 1954, 110; 609-613.  
Waddell, J.; Harris, B.; Patterson, S. and Steensma, J., "Training Child Amputees," *Crippled Child*, Oct. 1951.  
Wille, W. S., "Figure Drawings in Amputees," *Psychiat Quart. Suppl.*, 1954, 29; 192-198.

### "From Other Journals"

Unless noted otherwise, all abstracts have been prepared by Philip J. Rasch, Ph.D.

D. A. W. EDWARDS, "Estimation of the Proportion of Fat in the Body by Measurement of Skin-Fold Thickness." *American Journal of Clinical Nutrition*, 4:35-36, January-February, 1956.

Measurement of body fat by total body water or specific gravity is not suitable for general use in medicine. Anthropometrists have measured skin fold thickness, but this has no useful meaning unless the distribution of fat cells has the same pattern in all people in a particular broad age and sex group. The conclusion of this study is that within various age and sex groups the pattern of distribution of fat is the same for all members of the group, and that changes in the total amount of fat stored in the body involve similar changes in every fat-storing cell. The greatest source of error in making such measurements is the calipers. It is recommended that they (1) have a constant squeezing pressure over the whole jaw opening range up to 50 mm.; (2) the squeezing pressure should be about 10 g. per sq. mm. of jaw face; (3) the scale should allow readings to be taken to the nearest 0.1 mm.

J. V. G. A. DURNIN AND V. MIKULICIC, "The Influence of Graded Exercises on the Oxygen Consumption, Pulmonary Ventilation and Heart Rate of Young and Elderly Men." *Quarterly Journal of Experimental Physiology and Cognate Medical Sciences*, 41:442-452, October, 1956.

The purpose of this study was to compare some effects of exercise on the respiration and circulation of a group of young men and a group of elderly men, and to determine whether the differences, if any, were caused by the amount of gross body movement during exercise. The differences between the two groups while doing arm ergometer exercises were not statistically significant, but the differences while performing treadmill exercises were highly significant. Elderly people seemed able to perform hard work of restricted muscle groups if they were stationary, but the use of large muscle masses, the movements of many joints and the continuous readjustment of posture required in walking markedly reduced their efficiency.

"Calories in Cola Drinks," *Journal of the American Medical Association*, 158:241, May 21, 1956.

A six ounce bottle of Coca-Cola contains 78 calories; a twelve ounce bottle of Pepsi-Cola contains 159 calories.



CHARLES W. SIMON and WILLIAM H. EMMONS, "EEG, Consciousness and Sleep." *Science*, 124:1066-1069, November 30, 1956.

Depths of sleep as measured by the length or intensity of tones required to awaken a subject are related to increases in amplitude and decreases in frequencies of delta-type EEG patterns. Factual questions and answers were played at 5-minute intervals during the night to 21 sleeping normal male subjects. During periods when the delta patterns indicated that subjects were asleep, no learning took place.

EDWARD P. LUONGO, "Health Habits and Heart Disease—Challenge in Preventive Medicine." *Journal of the American Medical Association*, 162:1021-1024, November 10, 1956.

Study of cases of coronary disease emphasized the role played by total caloric intake. Overweight individuals should "cut down," not "cut out" food. Overweight, excessive caloric intake and lack of exercise were closely correlated in the coronary group. Tobacco and alcohol seemed to have little relationship to the production of coronary disease. There was no evidence that physical exercise at work or play produced coronary disease. Stress, however, may cause overeating. The evidence showed that sedentary living and poor health habits were the real culprits in coronary disease and not hard work, overexercise or occupational stress. Proper health habits, including nutrition and exercise, should be carried on into middle and old age.

C. D. CRUICKSHANK and M. D. TROTTER, "Separation of Epidermis from Dermis by Filtrates of Trichophyton Mentagrophyte." *Nature*, 17:1085-86, June, 1956.

Filtrates of *T. mentagrophytes* contain an enzyme or enzymes which are proteolytic. It is reasonable to believe that as the fungus grows in the more superficial layers of the epidermis, the proteolytic enzyme diffuses from it and loosens the epidermal attachments. Thus in areas exposed to friction, vesicles will appear. This enzyme may be responsible for the itching associated with epidermophytosis.

"The Olympic Games," *Medical Journal of Australia*, II:763-764, November 17, 1956.

The physiology of athletic effort is extraordinarily complex. Methods used in training are largely empirical. It is generally conceded that the circulation plays a special part. A particularly important consideration in athletics and one often forgotten, is that between capillary blood vessel and muscle fiber there is a layer of tissue fluid or lymph through which all interchange of oxygen, fuel, carbon dioxide and other exhaust substances take place. It is obvious that the thinner this layer is, the quicker will be the necessary transfer. This explains one of the benefits of training and is the main advantage arising from massage.

"Medical Arrangements at the Olympic Games," *British Medical Journal*, 5003:1234-1235, November 24, 1956.

The Olympic village casualty department is a remarkable source of knowledge to anatomist, physiologist, physician and surgeon. One example is the astonishing hypertrophy of the tibialis anterior and extensor digitorum brevis in the competitive walkers. Another is the much-feared lower-back pain of the same group. It is said that once this appears the walker's athletic career is likely to be at an end. Every type of athletics provides its own special injury. There are the calloused heels of walkers and long-distance runners, the strained lower-back of high jumpers, and the strained triceps and deltoid of the boxer. Detailed records are kept as a contribution to athletic medicine.

G. CLINTON KNOWLTON and ROBERT L. BENNETT "Overwork," *Archives of Physical Medicine and Rehabilitation*, 38:18-20, January, 1957.

Exercise, beyond a certain degree of load and repetition, can result in a long-lasting decrement of performance. Clinical reports have referred to a "generalized neuromuscular exhaustion syndrome." The unusual susceptibility to overwork of the muscles of persons just recovering from acute poliomyelitis point to the need for prudence in the prescription of exercise for such persons. Recovery from nerve trauma paresis can be delayed by injudicious exercise. Subjective feelings of the patient are not an adequate guard against overwork. Overwork usually results from a series of work sessions carried on from day to day at such a level and at such time intervals that adequate recovery cannot occur in the intervening rest periods. The patient must be indoctrinated with regard to possible effects of continued activity beyond the exercise tolerance and the supervisor must be alert to detect strength decrements and other signs of overwork.

KENNETH D. GARDNER, Jr., "'Athletic Pseudonephritis'—Alteration of Urine Sediment by Athletic Competition," *Journal of the American Medical Association*, 161:1613-1617, August 25, 1956.

Urine specimens were collected from 47 football players at the University of Pennsylvania. Formed elements (protein, hyaline and granular casts, red blood cells, epithelial, broad and white blood cell casts) formerly considered almost pathognomonic of parenchymal renal disease may appear after severe exercise without other evidence of glomerular nephritis. The name "athletic pseudonephritis" is proposed for this phenomenon. The desirable program for the athlete with upper respiratory infection and urinary sediment abnormalities is a one-week period of rest under observation. Until this time has elapsed, no final decision should be made as to the significance of findings in the urinary sediment.

H. C. BRENON, "Erythrocyte and Hemoglobin Studies in Thoroughbred Racing Horses," *Journal of the American Veterinary Medical Association*, 128-343-345, April 1, 1956.

A study was made of 207 normal racing thoroughbreds to determine the hematological picture under the circumstances of stress and periodical maximum effort found only under racing conditions. The average erythrocyte count was 6.798 million per cubic cm. of whole blood; the average hemoglobin concentration was 13.721 gm. per 100 cc. of whole blood. A limited study of the racing records indicated that a high blood count may be a factor in running ability. It indicates an index of stamina and physical condition and should be of great value if the trainer is attempting to race his horse only when it is at the physical peak.

DAVID RYDE, "The Effects of Strenuous Exertion on Women," *The Practitioner*, 177:73-77, July, 1956.

About the age of 8 to 11, a girl shows a desire for adventure and an excellent rhythmic sense. It is of value to teach team and competitive games and coordination and postural exercises. Running should be encouraged. Muscular exercise is necessary for development. About 85% of women can compete during menstruation and perform to their usual standard, but for emotional reasons they may prefer to refrain from competition. Menstruation apparently does not interrupt the performance of ballerinas and acrobats. On important occasions girls should be encouraged to compete. Half a grain (30 mg.) of phenobarbitone on the morning of competition may be helpful. Pregnant women should give up games in the second trimester. Caution should be observed in horseback riding and high jumping during pregnancy.

# Editorials

## MAN AND THE STOP WATCH

In many sports it is impossible to judge with any accuracy the comparative merits of athletes who competed in different eras. This is especially true of the combat sports (boxing, wrestling, fencing); the team sports where scores are recorded in terms of points (basketball, football, baseball, soccer, hockey) or such individual competitions as tennis, golf or gymnastics. Although speculation is rife among the experts as to who was more proficient, Bobby Jones or Ben Hogan; Joe Louis or Jack Dempsey; the Yankees of the late Twenties or their modern counterparts, there is no scientific method to establish a verdict in such matters.

It is only in those sports which are conducted as races over a measured course (swimming, track, skating) or in propelling an object (or one's self) over a measured distance or height that we can even attempt to evaluate the performances of the modern athlete against his earlier counterpart. It is in these sports that records are established by virtue of the man with the stop watch and the steel tape. The recent Olympic Games at Melbourne saw a tremendous assault on the record books with the Australian swimmers, the American track and field stars and the all-around Russians leading the way. Even we who hold that Modern Man in general is suffering from "armchairitis" must take cognizance of the fact that within the realm of comparative performance, the athlete of the modern world is the greatest ever to challenge time and distance.

## IT'S YOUR CONVENTION

Sit down and think for a moment. When was the last time that YOU attended an association convention? Yes, you've been an "active" member for nearly ten years, always paid your dues on time and even served on a committee—once! But somehow you've always been "too busy" when convention time rolled around, content to stay at home while others spent their time, money, and energies endeavoring to make the convention the kind of a success it deserved to be.

The Chicago meeting in July will mark the association's eleventh annual convention, and for the first time it will be presented in conjunction with two of our fellow organizations, the American Association of Rehabilitation Therapists and the Association of Medical Rehabilitation Directors and

Coordinators. The fact that the burden of operating the meeting will be shared this year does not in any way lessen the individual member's responsibility to support the convention. From an organizational standpoint this is the only meeting at which members may vote for national officers and take part in discussions relative to future policies; from a professional standpoint it represents the member's best opportunity to hear lectures and panel discussions by outstanding authorities speaking on matters concerning our field. From the social standpoint this should be one of our very best meetings for hospitable Chicago offers the widest variety of cultural and entertainment facilities in the Mid-West. We hope to see you there in July—remember it's YOUR convention.

## DRUGS ARE NOT ENOUGH

During the past two years an important scientific achievement has been made in the fight against mental illness—the successful use of drugs in the treatment of the mentally ill. These drugs have been hailed as a valuable adjunct in the treatment of mental disorders. For instance, with them patients who were not amenable to psychotherapy because they were "out of touch with reality" can now be reached by psychiatrists. Once disturbed wards are now quiet. Little restraint is now needed. Reports have come in which tell of the recovery of patients with whom all other treatment methods had failed.

But a note of caution is issued with these reports. They point out that these drugs are not effective with all mental illnesses, that they don't work on all patients, and that they do only part of the job. To be effective, they must be accompanied by psychotherapy. So these drugs are not a "cure-all" or an "end-all" to mental illness, even though they do present a hopeful picture for the treatment of the mentally ill.

More research is needed to fully explore the use and limitations of these drugs—because some side effects have been reported in their use. More research is needed to develop new treatment methods. More personnel is needed (in the thousands) to administer techniques we already know. But more than that, thousands of additional psychiatrists are needed to treat patients and to carry on research.

The need for these measures is urgent and it can only be met through public interest and action. During the month of May, 500 state and local affiliates of the National Association for Mental Health will be conducting a campaign for members and funds. Do your part by contributing and joining one of these associations.

The mentally ill can come back. But to do so they need our help—desperately. Let's help them by joining and supporting the organizations working in their behalf.

## GIVE TO THE SCHOLARSHIP FUND!

## Book Reviews

**"The Recreation Program."** (Chicago, Illinois; The Athletic Institute, 1954. 354 pp. \$3.00)

This book is the result of the Athletic Institute's second National Workshop on Recreation which was held in 1953. Each chapter was developed by a group of specialists in a designated area of education and recreation appropriate to the writings. The contents in the book covers a tremendous amount of specialized facets of the recreation field. Besides the sections on Nature, Scope and Program Planning, are detailed chapters on Arts and Crafts, Dance, Drama, Games, Sports and Athletics, Hobbies, Music, Outdoor Recreation, Reading, Writing and Speaking, Social Recreation, Special Events and Voluntary Services. Each chapter contains information necessary for setting-up and developing a complete program in each of the specialized areas. In general there is material on: Objectives; Organization and Administration; Facilities and Equipment; Leadership; Programming; Public Relationships; and Resources. This book is an excellent guide to any organization that is in the developmental phase of recreation and probably would be valuable to a functioning program through suggestions for improvement, variations and source material.

—HJB

**"Sport Medicine,"** edited by M. J. Karvonen. (Helsinki: Finnish Association of Sports Medicine, 1953. 229 pp. Paper.)

Here are the Proceedings of the International Symposium of the Medicine and Physiology of Sports and Athletics at Helsinki, Finland, July 17-18, 1952. One hundred thirty participants registered. American readers will readily recognize such names as Jokl, Cureton, Johnson and others. Forty-four "communications" are presented in this compilation. The majority are in English, but there are several papers in German and scattered contributions in Spanish and French. The range of subjects is very broad—the status of sports medicine in Japan, the prevention of sports injuries, effect of the liver on athletic efficiency, elbow injuries of javelin throwers, nutritional studies, etc. It is, of course, impossible to present here anything like an adequate review of such an assortment of topics and speakers. Not every article will be of interest to every reader, but the variety is such that no one interested in sports medicine can afford not to read at least parts of this book. In Czechoslovakia, Norway and the Soviet Union sports medicine is a recognized part of the medical curriculum. The participants in this symposium adopted a resolution calling for it to be given similar recognition in other countries as well. Certainly the United States should be one of the first to respond to such an appeal. Trained as they are in physical education and working as they do with medical personnel, the corrective therapists would seem to be a logical group to contribute to the organization and development of this area.

—PJR

**"Making the Years Count."** (New York State Joint Legislative Committee on Problems of the Aging, Albany, New York. 1955. 162 pp.)

The New York State Joint Legislative Committee on Problems of the Aging, under the chairmanship of Senator Thomas C. Desmond, has published an excellent magazine-form report available free of charge to all those interested in our Senior Citizens. This booklet contains twenty-five articles pertaining to the aging that have been written by leading authorities in the fields of health, education, social work, housing, employment, etc.

—HJB

**"Sports in the Cultural Pattern of the World,"** edited by Ernst Jokl, et al. Helsinki: Institute of Occupational Health, 1956. 116 pp. Paper. (Available in the U. S. from Kentucky Rehabilitation Center, U. of Kentucky, Lexington. \$5.00)

*Sport Medicine*, reviewed above, was the physiological report on the 1952 Olympic Games. This is the sociological report, the attempt to assess the significance of the Games. Rather surprisingly, there was no sociologist among the editors, and to some extent the paper reflects the lack of one trained in this discipline. Such problems as the role of geography, population, women, climate, nutrition, economic conditions, etc. are discussed. The editors are particularly impressed by the moral and social implications of the presence of white, black and yellow-brown athletes on the U. S. team, and consider that this presents a distinct challenge to the colonial powers in Africa and Asia. They hold that the achievement of women in the Games reflects their social status in their countries. No instance of "over straining" was observed among the participants; in fact one of the feminine medal winners still suffers from the sequelae of an early polio infection. The concept of sports as "freedom based upon rules" suggests that the athletes of the world are far more developed socially than are the statesmen. The booklet is profusely illustrated; unfortunately there are many instances in which the event and the participants are not identified. This report presents the sort of material that is necessary if the Games are to be evaluated as a social and educational experience. Its authors are to be commended.

—PJR

**"Principles of Medical Statistics,"** by A. Bradford Hill. (New York: Oxford University Press, 1955. 314 pp. \$4.00)

"It is," says the Editor of *The Lancet* in the Foreword to this book, impossible to "escape the conclusion that the solution of most of the problems of clinical or preventive medicine must ultimately depend" on "clinical trials devised . . . in such a form that statistically reliable conclusions can be drawn from them." Medical statistics differ in some respects from those which are best fitted for other purposes and it is the aim of this book to present the techniques the author considers most useful in this particular field. Primarily these are averages, the standard deviation,  $X^2$  and the coefficient of correlation. This is not a book from which to learn the methods of statistical computations; rather its value lies in its explanation of experimental design and interpretation of results. The chapters on "Common Fallacies and Difficulties" and "Clinical Trials" should be required reading for every therapist considering undertaking investigation of a medical problem. Appendices contain Definitions, Exercises, Answers to Exercises, Random Sampling Numbers and Table of  $X^2$ . An index completes a text which deserves a place in every Corrective Therapy library.

—PJR

**"Straight To The Heart,"** by George Lawton. (International Universities Press, Inc.: New York, 1956. 338 pp. \$5.00)

The author describes his experience with aortic stenosis from the standpoint of one who was sentenced to death unless a relatively new method of cardiac surgery proved successful. He was the 25th patient at the Bailey Clinic to be subjected to a new operation on the aortic valve. The author, a psychologist, portrays in vivid word pictures the reactions and feelings of a patient who is offered a chance to escape certain death by submission to an unproved form of surgery; his inner struggles as the time approaches; and his final feelings when he realizes that the operation is a success. The book ends with a final chapter by his wife, written by one who waited, suffered empathetically and finally realized the depth of the love which had been allowed a continued existence. Anyone responsible for the care of the cardiac patient will want to read the book for the insight it can give, and it offers intriguing reading for anyone.

—MLB



**"Index and Abstracts of Foreign Physical Education Literature."** Vol. I, 1955, 75 pp., Mimeographed. Paper bound. Vol. II, edited by Henry J. Montoye, 1956, 89 pp., Mimeographed. Paper bound. (Indianapolis: Phi Epsilon Kappa Fraternity.)

Phi Epsilon Kappa has done a service to the entire physical education profession by making these indices and abstracts available. Under such headings as Sports Medicine; Health Education; Rehabilitation; Correctives, Posture; Athletics; Physiology of Exercise and Physical Fitness, they have indexed articles appearing in journals published outside of the United States. In most cases an abstract of the article is provided. Like any new service of this kind, there are rough spots. Some of the abstracts do not communicate anything meaningful; some are actually book reviews; the quality of abstracting varies greatly from article to article. A considerable improvement is evident in Volume II, and it may be anticipated that under Editor Montoye's guidance this *Index* will become a standard reference tool. Readers of this *Journal* will have numerous occasions to make use of these volumes; it would be a useful public service if those competent to make translations of foreign language publications would make their services available to the Editor. Every Corrective Therapy library should make it a point to obtain both of these volumes.

—PJR

**"Body Measurements and Human Nutrition,"** edited by Josef Brozek. (Detroit: Wayne University Press, 1956. 167 pp. \$3.50)

In June, 1955 a Conference on the Role of Body Measurements in the Evaluation of Human Nutrition was held at Harvard University. This is the proceedings of that conference. Unlike many similar reports which have come to this reviewer's attention, this one can show definite accomplishments in the form of specific recommendations concerning body measurements. From the standpoint of the Corrective Therapist and others engaged in the field of health, the outstanding aspect of the conference will be Marks' presentation of evidence that excess weight is associated with decreases in vitality and longevity. According to his findings, the excess mortality of the obese is primarily due to diseases of the cardiovascular-renal system, diabetes and liver and gallbladder disorders. Kurlander, Abraham and Rion, however, reported that they found no relationship between body fat and heart disease, although they noted a pronounced relationship between other body components and heart disease. White presented a table of mean weights for 25 year old men which seems to have been prepared on a basis much more satisfactory than that of the customary insurance tables. It is to be hoped that it will prove possible to present this in a form which will be more usable by the average man and that similar tables for other age groups can be prepared. The usefulness of the individual articles is increased by the fact that the authors have furnished bibliographies of the literature cited. These proceedings appear to be required reading for physical anthropologists, physicians, physical education teachers and others who may be engaged in nutritional surveys.

—PJR

**"Five Hundred Over Sixty,"** by Bernard Kutner, et al. (New York: Russell Sage Foundation, 1956. 345 pp. \$4.00).

What can we do about the problems of the aging? This is the question that is coming to the front more and more in our society. We all acknowledge the fact that there are problems to be overcome. The issue is what specifically are these problems and what can we do to solve them effectively. The Russell Sage Foundation with the Department of Health of New York City, Cornell University's Medical College and Social Science Research Center have jointly attempted to find the answers to these questions through a community survey of five hundred aging people residing in the Kips Bay-Yorkville district of New York City. This study was not intended to be "... a final model for other areas; it aims instead to suggest ways of approaching the

problems of aging . . ." The book is divided into four sections. Part I states the problem and describes the community and population surveyed. Part II uses the criterion of morale and attempts to measure adjustment of the aged in regard to marriage, employment, activity, isolation and socialization. Part III considers the problems of health and Part IV analyzes the trends in services and program. The book is a fine survey that establishes a vivid picture of the aged situation as it now appears in a district of New York City. This objective approach is concluded with a real and speculative summation of the trends in a program for the aging.

—HJB

**"Athletic Injuries,"** by Augustus Thorndike. (Philadelphia: Lea & Febiger, 1956. Fourth Edition. 252 pp. \$4.50)

This is the latest edition of a standard text on athletic injuries. One point very much in its favor is that it is almost the only book on the subject which relates athletic training to studies which have been made by physiologists and others concerned with human performance. It is, however, written primarily from the viewpoint of the physician and in some respects is not as useful to the trainer as are certain other texts. Very few readers will have any interest in the history of Harvard's athletic medical department, and the reason for the inclusion of a chapter on this subject is not at all clear. The reader may also question the value of the space devoted to the Harvard step test. Wells has criticized the idea that functional tests can predict athletic performance. It seems increasingly evident that a man's fitness for a given activity can be measured only by his performance in that activity. More attention could profitably have been devoted to prevention of injuries—for instance there seems to be nothing on the proper way of wrapping a boxer's hands. The drawing on p. 77 is inverted. An index is provided, but the failure to include such common terms as "Charley horse" limits its usefulness to the trainer. Nevertheless, its good points far outweigh its weak ones. This is probably the best text available on the subject and should be considered a must for all those doing athletic training.

—PJR

**"Silent Spokesman,"** by Wayland W. Lessing. (Chicago: Hospital Topics, 1956. 36 pp. \$1.50)

This booklet is designed to enable aphasia patients to communicate with those who care for them. It is similar to but more extensive than the Sklar-Bennett chart described in an article in the March-April, 1956 issue of this *Journal*.

—PJR

**"The Ignoble Art,"** by Edith Summerskill. (London: William Heinemann Ltd., 1956. 104 pp. \$1.52)

This is a rambling, poorly organized attack on boxing, based principally on the plea that there is too much aggression evident in the world and that the first step towards world peace is to control all destructive impulses. The reader may well ask why the author does not report the use of boxing by the CYO and other youth organizations to direct these impulses into acceptable channels, but perhaps she overlooks this in making the point that "boxing in the past has tended to symbolize the American approach to life." As Rasch, Fahey and Magrill have indicated in their "The Role of the Athletic Commission Physician," boxing is particularly vulnerable to attack on medical grounds, and it may well be that it has no place in any truly civilized community. Even when dealing with the medical phase of the subject, however, the author's references are seldom properly cited and she carefully omits all mention of the Wisconsin studies, the Blonstein-Clarke paper and other data favorable to boxing. The book is written from an emotional standpoint rather than as a reasoned investigation of boxing, and hence will do little to accomplish the author's objective.

—PJR



**"Prelude to Healing,"** by William J. MacMillan. (London: Faber and Faber, 1957. 200 pp. \$2.24)

Regular readers of this column will recall *The Reluctant Healer*, reviewed in the September-October, 1954, issue. In the present book MacMillan recounts his life before he came to recognize the power that was granted him. With the nostalgic reflection, freedom from bitterness and quiet humor of his earlier book, he describes the confusing events of his boyhood and the insecure, unadjusted personality that resulted from them. He experienced illumination of the type familiar to the readers of Bucke, but even this was not followed by any noticeable change in his situation. An attempt to affiliate with the clergy of an orthodox sect only served to underline the difference between organized religion and Christianity. It was not until he learned of his ability to heal that he found his niche in the world. And even there he was frustrated by the outbreak of World War II and his enforced return to the United States. Corrective therapists will be interested in the fact that in his healing work he found it necessary to have the assistance of an exercise therapist. MacMillan died suddenly while writing this autobiography, so we shall see no more works from his pen. His readers will wish him well in the "change of consciousness" which he believed was the meaning of death.

—PJR

**"An Inventory of Social and Economic Research in Health,"** compiled by Frederick R. Strunk, Fifth Edition. (New York: Health Information Foundation, n.d. 254 pp. Paper bound.)

This inventory was compiled by sending out questionnaires and tabulating the answers under headings dealing with specific areas or groups, mental health, social and cultural data, facilities, services and education, personnel, and medical costs. Each investigation is discussed in terms of the problem, the project, publications, etc., and is cross-indexed by subject, organization, personnel, area and sponsors. It is hard to imagine a more complete presentation of the subject. Through any one of these approaches the reader may learn that the Association for Physical and Mental Rehabilitation has three research projects under way. The book will be of use to everyone who desires to know what is being done in research in health and should be in the library of every health agency.

—PJR

**"Your Blood Pressure And How to Live With It,"** by William A. Brams. (Philadelphia: J. B. Lippincott Company, 1956. 160 pp. \$2.95)

Dr. Brams' subject holds great attraction to many people today, since he reports that some fifteen million people in the United States manifest the symptoms of high blood pressure. Offering a plausible explanation for this, he points out that our present way of living is not solely to blame since people are actually living longer. This, plus the fact that Americans are frequently overweight, has caused an apparent, as well as an actual, increase in the appearance of hypertension. The book is written in easily understood language and with an excellent definition of the scope of the entire problem as it may affect the reader. It is aptly pointed out that the symptoms often attributed to high blood pressure may actually be due to causes of which the blood pressure itself is merely a symptom. In keeping with this line of thought, Brams offers an element of hope so sorely needed, especially in an illness of the nature of hypertension where one's mental outlook may influence the course of the illness. He points out that the patient's symptoms may not be due to the blood pressure itself; that the cause may be found and eliminated; that by learning to live with one's hypertension, trouble may be prevented and longevity anticipated. The author gives "Rules for Living With High Blood Pressure," "Rules for Living With Low Blood Pressure," weight charts and diet charts. These will be of value for anyone with a tendency to blood pressure difficulties or actually afflicted with them.

—MLB

**"Clinical Examination in Neurology,"** Section of Neurology and Physiology, Mayo Clinic. (Philadelphia: W. B. Saunders, 1956. 370 pp. \$7.50)

This book presents an outline for complete neurological examinations. It is more than a series of neurological test procedures in that it correlates the significance of the varied test techniques with the anatomy and physiology of neurological disease. Sections included are neurophthalmology, language and motor speech, electroencephalography, electromyography, bio-chemical and pharmacological testing. The chapter on the specific study of muscle is clearly outlined and well illustrated. For the student and specialist in physical and mental rehabilitation, neurologist, psychiatrist, clinician, teacher, and research worker, this book will prove a clear, practical reference. It fulfills requirements for a teaching text and could well be used by students as a basic source for both didactic and clinical training. To the practicing clinician it provides a desk reference which is accurate, integrated and so outlined as to provide quick answers to factual questions which may occur either during or following routine or special examination of the nervous system. The index is unusually complete, illustrations and line-drawings are clear and the pocket at the back of the cover contains a multitude of history forms as used by the Department of Neurology at Mayo Clinic.

—DCL

**"Here's Power for You,"** by David Manners. (New York: Sentinel Books Publishers Inc., 1956. 128 pp. \$2.95)

The contents of this book fall naturally into five sections. The first discusses the benefits to be gained from formal exercises and the methods of employing them. The remaining four describe exercises with calisthenics, dumbbells, pulleys and barbells respectively. The reader is thus enabled to utilize any one of these four techniques to solve whatever physical problems he may have. With the exception of the consistent use of the word "power" when it is clear that strength is actually meant—as in the title itself—there appears to be little to criticize in the text. The book is profusely illustrated and is obviously designed for the man who has had little experience with exercise. While it will not be of direct use to corrective therapists or other professionally trained individuals, they may find it a convenient source to which to refer lay persons who feel the need for some sort of physical training but cannot join a gym.

—PJR

Publishers are requested to forward review copies directly to the Book Review Editor, Philip J. Rasch, Ph.D., 567 Erskine Drive, Pacific Palisades, Calif.

#### BOOKS RECEIVED

**"Games for the Not-So-Young"** by Sid G. Hedges. (New York: Philosophical Library, 1957. 107 pp. \$2.75)

Elementary descriptions of backgammon, checkers, dominos and other quiet indoor games.

—PJR

**"None Can Be Called Deformed,"** by Bernon Mallison. (London: William Heinemann Ltd., 1956. \$1.80)

A study of the life-adjustment problems of 36 crippled adolescents.

—PJR

**"The Golden Years,"** by Thomas Collins. (New York: The John Day Co., 1956. 251 pp. \$3.75)

A discussion of retirement problems.

—MLB

**"Occupational Therapy,"** by William Rush Dunton, Jr. and Sidney Licht. Second Edition. (Springfield: Charles C. Thomas, 1957. 373 pp.)

A revised edition of an excellent text. The chapter on "Recreational Therapy" is contributed by John Eisele Davis.

—CCT

## Chapter Activities

### TEXAS-LOUISIANA CHAPTER

The Texas-Louisiana chapter of APMR and the Texas chapter of AART will hold a joint scientific and clinical conference at the Veterans Administration Hospital, Waco on April 12-13. Dr. Ernest A. Wilbur, Chief CT, VAH, New Orleans and President of the APMR chapter, will preside at the proceedings held on the first day of the conference. Mr. William James, President of the Texas chapter, AART, will preside on the second day.

The following program has been tentatively scheduled for the conference:

**Friday, April 12**

Theme: "Interpersonal Relationships in the Treatment of Patients."

- 10:30 A.M. Opening Address. George A. Walker, Area Representative, PM&RS, VA St. Louis Medical Area, St. Louis, Mo.
- 11:00 A.M. Symposium: "Interpersonal Relationships as We See Them"—Chairman, Dr. Martin E. Grobman, Chief, PM&RS, VAH, Waco, Texas.
- "From the Standpoint of the Physical Therapist"—Miss Dorothy V. Noll, VAH, Waco, Texas.
- "From the Standpoint of the Educational Therapist"—Mrs. Irma A. Andrews, VAH, Kerrville, Texas.
- "From the Standpoint of the Corrective Therapist"—John R. Pharr, VAH, Waco, Texas.
- "From the Standpoint of the Manual Arts Therapist"—Carl D. Mayfield, VAH, Temple, Texas.
- "From the Standpoint of the Occupational Therapist"—Miss Mary L. Kaylor, VAH, Waco, Texas.
- 1:30 P.M. Keynote Address: Dr. Rawley E. Chambers, Director of Psychiatry, Board of Texas State Hospitals and Special Schools, State Health Department, Austin.
- 2:30 P.M. "Changes in Corrective Therapy due to Tranquillizing Drugs and Subsequent Effects on Relationships"—Weldon T. Harris, CT, VAH, Waco, Texas.
- 3:00 P.M. "Interpersonal Relationships as they Affect Tubercular Patients"—Fred E. Pawcett, MAT, VAH, Waco, Texas.
- 3:45 P.M. Panel: "Interdisciplinary Relationships"—Dr. Louis W. Leskin, staff psychiatrist; Dr. Donald R. Gorham, clinical psychologist; Glenn W. Rollins, Assistant chief, Social Service, VAH, Waco.
- 4:15 P.M. "Attitude Therapy"—Wilbur Stanford, MAT, VAH, Houston, Texas.
- 4:30 P.M. "Factors which make Interpersonal Contact with Patients More Difficult"—Dr. S. Bergen Morrison.
- 7:00 P.M. Banquet.
- 8:00 P.M. Business Meetings.
- Saturday, April 13**
- Theme: "Contributions Toward Effective Treatment of Patients."
- 8:45 A.M. "A Functional System of Master Scheduling in PMR Service"—J. R. Green, VAH, Houston, Texas.
- 9:00 A.M. "Observation of Specific Exercises and Their Stabilizing Effect on Chronic Shoulder Dislocations"—Karl K. Klein, Department of Physical Education, Univ. of Texas.
- 9:15 A.M. "Dynamics of Behavior as Interpreted Through Finger Painting"—Dr. Frank R. DiPaula.
- 10:00 A.M. "Motivational Technique in Group Classes of Educational Therapy Patients"—Robert Koller, ET, VAH, Waco.
- 10:15 A.M. "The Role of Community Agencies in Continu-

ing Effective Rehabilitation"—Norman H. Frederick, YMCA, Waco.

10:30 A.M. "Motivation Through the Use of Hobbies"—J. Fred Morgan, MAT, VAH, Waco.

11:00 A.M. To be announced.

Noon. Summation: Dr. Lewis A. Leavitt, Chief, PM&RS, VAH, Houston.

### NEW ENGLAND CHAPTER

New officers of the chapter are Robert Hodgdon, President; Joseph Colello, Vice President and Irwin Freedman, Secretary-Treasurer.

The chapter participated in a joint conference on rehabilitation, March 15 at the Boston YMCA. Other groups sponsoring the conference were the New England Chapter, National Association for Music Therapy; Massachusetts Chapter, National Multiple Sclerosis Society; United Cerebral Palsy of Boston, Inc.; Massachusetts Division of the Blind; Massachusetts Heart Association; New England Chapter, American Rehabilitation Association; Massachusetts Tuberculosis and Health League; Epilepsy Information Center, Inc. Massachusetts Chapter, National Rehabilitation Association; and the Boston Young Men's Christian Association.

George Heos, Vincent Andersen and Robert Hodgdon of the APMR served on the program committee; Ben Parker was in charge of films and Frank Deyoe demonstrated ambulation and rehabilitation procedures used with paraplegics as a part of the program presented at the conference.

### CALIFORNIA CHAPTER

The following have been elected chapter officers for 1957: Fred A. O'Banion, 6624 Peach Ave., Van Nuys, President; Richard G. Fowler, 3586 Tilden Ave., Los Angeles, First Vice President; Francis J. Dolan, 857 York St., Oakland, Second Vice President; Thomas C. Meyer, 7329 White Oak Ave., Reseda, Secretary; and Tom Brown, 3149 1/2 Garden St., Los Angeles, Treasurer.

## A NEW MENTAL PATIENT EVERY TWO MINUTES...

Every 2 minutes—day in and day out, someone somewhere is admitted to a mental hospital! Usually a hospital with too few doctors, too few beds, too little hope for the recovery that is possible for mental patients.

The mentally ill *can* recover—sooner—if you help. Join the citizens fight for more trained hospital personnel, more research, more prevention.

In this fight, dollars are weapons.

Give generously—now—to your local MENTAL HEALTH CAMPAIGN... or mail your contribution to Mental Health, care of your Postmaster.



# An Award To Ike

Gov. Adams Accepts  
Association Plaque  
on Behalf of  
Mr. Eisenhower.



Arthur Landy presenting the rehabilitation award to Presidential Assistant Sherman Adams at the White House. Joseph Van Schoick, Dr. A. B. C. Knudson and Dr. John E. Davis look on.



The Association for Physical and Mental Rehabilitation presented its Special Rehabilitation award to President Eisenhower at a ceremony held at the White House on February 14. Presidential Assistant Sherman Adams accepted the award, a scroll-shaped copper and oak plaque, in behalf of the President.

In making the presentation, Arthur Landy, president of the Association, cited the appreciation of the membership for President Eisenhower's deep and realistic interest in meeting the needs of the disabled in this country and contributing so effectively to their spiritual and economic progress. He called attention to the President's endorsement of a philosophy stressing the usefulness of every citizen which is transforming the so-called mental and physical handicaps into assets. Mr. Landy commended the government's rehabilitation program for disabled veterans and its recent interest in the problem of physical fitness.

## News and Comments

### TEACHERS COLLEGE SCHEDULES WORK CONFERENCE ON RECREATION IN REHABILITATION

A work conference on recreation in rehabilitation will be held at Teachers College, Columbia University, from June 3 to 14 and/or June 17 to 28 for recreation leaders in hospitals, nursing homes, and rehabilitation centers. The sessions at Teachers College will be conducted during morning hours. Part of each day will be spent in hospitals, nursing homes, and rehabilitation centers. There are no formal academic requirements and no credit is given for the conference. The work conference fee for those not desiring university credit will be \$60. For details, write in advance to Professor Josephine L. Rathbone, Teachers College, Columbia University, New York, 27, New York.

### ANNOUNCE COURSE ON NEUROMUSCULAR DISEASES

The Cook County Graduate School of Medicine has announced an intensive course in Neuromuscular Diseases of Children with special emphasis on cerebral palsy, to be given by Doctor Meyer A. Perlstein for the two-week period from July 8th to 19th. The course will be an intensive, didactic and clinical course designed for pediatricians, orthopedists, neurologists, psychiatrists and physiatrists interested in the care and treatment of children with neuromuscular handicaps. Emphasis will be placed on the practical clinical aspects of treatment and rehabilitation procedures.

The Course will include itinerant clinics to round out the program in most of its practical aspects. The fee for the course, which is \$250, will include the cost of luncheons during the two-week period, as well as the expense of travel, meals and accommodations during the trip to the field clinic. For further information, write to John W. Neal, Registrar, Cook County Graduate School of Medicine, 707 South Wood Street, Chicago, Illinois.



## CARDIAC MONITOR SAFEGUARDS SURGERY

The risk of sudden death at surgery has been reduced through the development of a new instrument by scientists and doctors at the Hines, Ill., Veterans Administration Hospital. Called a "Cardiac Monitor," the transistorized device permits continuous and instantaneous monitoring of the heartbeat during surgery and for use during non-surgical emergencies. The meter warns the doctor that the heart is not working properly and that remedial steps are indicated.

Standard electrocardiograph electrodes are strapped on the forearms of the patient. These pick up the cardiac impulse and feed it into the machine. This impulse is amplified by the transistor circuit and indicated on a meter. Controls consist of amplitude and fidelity knobs. A phone jack is provided should it be desirable to feed the heartbeat into a recording device or headphones. The use of transistors and small batteries makes the unit portable. It is housed in a 6x5x4 inch aluminum case that is equipped with a carrying handle. The total weight is 3 pounds. The power supply consists of four standard-sized flashlight batteries.

The monitor has been successfully tested at Hines. It has provided an immediate diagnosis of irregular heart action and may anticipate stoppage of the heart. It has even been able to provide monitoring of the heart rate during profound shock when the patient was clinically pulseless, VA said.

VA added that the cardiac monitor may be especially useful during cases of extreme shock as it provides accurate information that the heart is still functioning even though the blood pressure and pulse may not be detectable. This should prevent unnecessary opening of the chest for cardiac massage. Instead, the doctor can initiate other measures to return the blood pressure and circulation to normal without loss of valuable time in trying to assure the correct diagnosis, VA said.

Nurses, technicians, and even non-medical rescue personnel can operate the monitor readily because of its simple design and mechanism, VA said.

While the monitor was developed to give an instant picture of the heartbeat as an aid to the surgeons and anesthesiologists in a large general hospital, it might be of even greater value in the small hospital or for use during dental anesthesia, when a qualified anesthesiologist is less likely to be available, VA said.

The device was designed and developed at the radio-isotope, medical and surgical services of the Hines, Ill., VA hospital by Theodore Fields, M. S., Dr. Ervin Kaplan, Dr. Bernard Abrams, Dr. Robert Simpson, Dr. Archer Gordon, and Joseph Kenski, E. T.

## NEW VA STATISTICS ON TB

Improved treatment for tuberculosis developed by Veterans Administration has reduced the number of TB patients receiving VA hospitalization by more than 3,000 in the past three years. Dr. W. B. Tucker, director of the tuberculosis service at VA central office in Washington, D. C., said the average daily number of VA patients with TB in hospitals dropped from 15,675 in January 1954 to 12,528 in December 1956.

The number of VA patients in TB hospitals is expected to reach a fairly constant figure within the next year or two as the rate of decline slows, Dr. Tucker said.

The decrease in need for hospitalization of veterans with tuberculosis has resulted from learning how to use the so-called "TB wonder drugs"—streptomycin, PAS, and isoniazid, he said. Dr. Tucker said the drugs were brought into general use for treatment of the disease in large part as the result of VA's internationally known TB chemotherapy program.

Begun in 1946, the continuing project for testing newer TB drugs in cooperation with the armed forces has involved more than 50 VA, Army, and Navy hospitals and some 15,000 patients to date. Beds that become available in VA hospitals because of the decreased need for hospital care of TB patients will be used for patients with other conditions as the need develops locally, VA said.

## PATIENT COUNCILS SUCCESSFUL IN PSYCHIATRIC HOSPITALS

Democracy in action is proving useful as a new weapon against mental illness in 30 Veterans Administration hospitals. Dr. S. T. Ginsberg, chief of the psychiatry division at VA central office in Washington, D. C., said patient representatives elected and organized under democratic principles give patients voice in the management of their affairs at the hospitals.

VA psychiatrists have found this "patient government" useful in the treatment of mental illness because of the self-development, the cooperation, and the acceptance of responsibility it fosters, Dr. Ginsberg said.

Dr. Ginsberg said patient-governments in VA hospitals are mainly of two types:

1. Patients on a ward elect several of their members as a council to represent the ward in joint meetings with members of the hospital staff.

2. Patients organize as an overall group along the lines of a community citizens' association, with a constitution and by-laws and periodic meetings presided over by elected officers.

These patient-governments operate in planning recreation for patients, establishing ward regulations for patients' conduct, assigning housekeeping duties, recommending disciplinary measures, welcoming new patients and many other activities, Dr. Ginsberg said.

Although patient-governments often have the effect of improving administrative procedures and relationships between patients and staff members, the main effect is to give patients opportunities for initiative and self-expression and for assuming responsibility for themselves and their fellow man, Dr. Ginsberg said.

## DR. WILLIAM L. HUGHES DIES

Dr. William L. Hughes, professor and director of health and physical education at Temple University, died in Washington, D. C. on Feb. 20 after suffering a heart attack. Dr. Hughes, 62, had been a member of the Temple faculty for the past 12 years. He was professor of physical education at Teachers College, Columbia University from 1930 to 1945 and held the degrees of M.A. and Ph.D. from that institution as well as an honorary Sc.D. from Boston University. Prior to his service at Columbia Dr. Hughes was athletic director at Otterbein College and DePauw University.

Dr. Hughes served as chairman of the national advisory board of the division of physical fitness of the Office of Civilian Defense during World War II. He was president of the American Association for Health, Physical Education and Recreation from 1944 to 1946 and of the College Physical Education Association in 1934. He was the author of several textbooks widely used in physical education of which *Athletics in Education* and *The Administration of Health and Physical Education in Colleges* are best-known. Dr. Hughes also served as editor of several books on athletics including *The Book of Major Sports*.

## DR. BALSAM IN NEW POST

Dr. Frederick J. Balsam, program development chief in the physical medicine and rehabilitation service of Veterans Administration in Washington, D.C., has been transferred to the VA hospital at Ann Arbor, Mich., VA has announced. Dr. Balsam will direct the physical medicine and rehabilitation service at the Ann Arbor hospital and will hold a faculty appointment at the University of Michigan Medical School.

During his three years as program development chief in the physical medicine and rehabilitation service in Washington, Dr. Balsam initiated VA's career residency training program for physicians in this specialty and made many contributions to the development of the service in VA hospitals. He is a former member of the editorial board of this *Journal*.



# Corrective Therapists

YOUR OFFICIAL INSIGNIA NOW AVAILABLE AS A  
PROFESSIONAL PIN

- 10K GOLD-FILLED
- ENAMELLED C AND T
- SAFETY-CLASP

CUT ENLARGED TO SHOW DETAIL



THIS SALE IS NON-PROFIT  
ALL PROCEEDS BENEFIT OF  
APMR SCHOLARSHIP FUND

**ACT NOW!**

Pins Only \$5.— Each

Mr. Dave Ser, Coordinator  
APMR Scholarship Fund  
43-01 46th St.  
Long Island City 4, N. Y.

Make Checks Payable to  
Association for Physical and Mental Rehabilitation

Dear Sir:

Please send me \_\_\_\_\_ Corrective Therapy Pins at \$5.00 each. Enclosed you will find  
\$ \_\_\_\_\_ to cover the cost of the pin(s).

\_\_\_\_\_  
(Name)

\_\_\_\_\_  
(Address)

Hospital Affiliation \_\_\_\_\_

## HOSPITAL TRIES TRANSITION PLAN FOR PATIENTS PRIOR TO DISCHARGE

A novel experiment in return to normal living for recovering mentally ill patients is underway at Leech Farm Road Veterans Administration Hospital in Pittsburgh, Pa. Called PDQ—for Patient Discharge Quarters—it is the first plan of its kind tried in the nation to condition psychiatric patients for the transition from long-term hospitalization to life outside the hospital, Dr. Lee G. Sewall, hospital manager, said. PDQ sets aside a hospital ward for patients who have passed the acute stage of their illness but need from two to six months further hospitalization, Dr. Sewall said.

There are no physicians, no nurses, no aides, and no locked doors. The patients run their own community. The ward is staffed by one hospital official, John F. Muldoon, Ph.D., a counseling psychologist. Dr. Muldoon said that as a new departure in mental rehabilitation, PDQ is providing a basis for a research study of this kind of way-station in a mental hospital.

The group atmosphere that fosters "in-group" feelings has given encouraging results, he said. Many of the patients work in town and use the ward as a home. Others work in the hospital, not with patients but with the hospital staff. They care for their own rooms, take their own medicine without supervision, get their own money at the end of the week, and spend it as they see fit.

Dr. Muldoon said the patients hold a meeting once a week and elect a council of five once a month. The recipient of the most votes serves as chairman. The ward is governed through the council, which deals with regulations, recreation, and discipline. Dr. Muldoon serves as co-ordinator for the approximately 30 patients in PDQ and the hospital staff. "About the only things patients don't handle are medical problems," Dr. Muldoon said. "Other than that, they run the whole show."

### RESEARCH ASSISTANT NAMED FOR TRANQUILIZER STUDY

Appointment of M. H. Gordon, Ph. D., as assistant director of the central research laboratory for the nationwide evaluation of tranquilizing drugs in Veterans Administration hospitals was announced by VA today.

Dr. Gordon was formerly chief of the clinical psychology service at the VA hospital in Knoxville, Ia. In his new appointment, he will work at the VA hospital at Perry Point, Md., the base for the tranquilizers study, which is just getting underway.

## Handicapped Drivers!

### DRIVE YOUR CAR

—SAFELY  
—EASILY

with new  
Improved  
Mechanical

GAS & BRAKE

**HAND**

**CONTROLS**

**\$39.50**

Plus Postage  
with copy  
of this ad

**KITS CAN BE  
INSTALLED  
IN 2 HOURS**



Here's the greatest development in handicapped driver controls. One lever does both operations — works both brake and gas — makes your car absolutely fool-proof. The slightest touch of your fingers now operates your car. Other units selling at more than three times our price cannot give better performance. We guarantee this on a money-back basis. Thirty years' experience in building automatic clutch and brake controls is behind this guarantee. CALL OR WRITE FOR FREE PAMPHLET.

**Brake**

**Center, Inc.**

Chas. Libby, Pres.

**3716 QUEENS BLVD.**

**LONG ISLAND CITY**

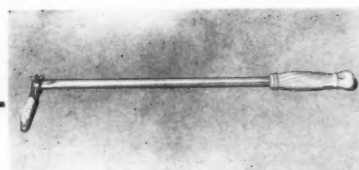
**NEW YORK**

STillwell 4-6417

### HOYER LIFTER FOR HOME AND HOSPITAL



FOR FURTHER INFORMATION WRITE  
DEPT. AM-3, TED HOYER & CO., INC.  
BOX 949, OSHKOSH, WISCONSIN



### Encourage Independence with **X-TEND** Longhandled Toothbrush

An invaluable health device, one of several we have designed specifically for the physically disabled with limited range of motion in arms, shoulders, or hands. 18" long, with varied connection to set toothbrush at 45° or 90° angle, as desired. Made of tubular aluminum, with safti-grip handle and special replaceable toothbrush. Complete, prepaid in U.S., .... \$1.95 each

#### DISCOUNTS

To Recognized Hospitals and Institutions

ONE OF MANY ITEMS DESIGNED for the physically disabled, shown in our catalogue offered below.

## FASCOLE CORPORATION

Dept. 5-A

Shopping Center for the Physically Disabled  
229 Fourth Avenue, New York 5, N. Y.

### Free New Catalogue

"A New Shopping Center for the Physically Disabled" offers a complete line of intimate, personal items and self-help devices for paraplegic, disabled, and recuperating persons. WRITE ON YOUR LETTERHEAD NOW.



PHYSICAL  
THERAPY

For Treatment  
of

**SPASTIC CASES • CEREBRAL  
PALSY • STROKE • POLIO  
HAND INJURIES**  
GENERAL ELECTRIC COMPANY'S  
SILICONE

### BOUNCING PUTTY

Does Not Harden • Lasts Indefinitely  
Can Be Autoclaved

As A "Trial Order"—Send \$2.00 For One  
\$2.85 Jar

**S. R. GITTENS, Sole Distributor**  
1620 Callowhill St., Philadelphia 30, Pa.

## FREE BROCHURES on Corrective Therapy and

Assoc. For Physical & Mental Rehab.

Mail Requests to: KENNETH DENING  
226 Wyman Rd., North Abington, Mass.

# Classified Directory

Price of Directory Listing for one Year—6 issues—\$10.00

## STORES WHERE EVEREST AND JENNINGS PRODUCTS MAY BE PURCHASED

BOWERS AMBULANCE SERVICE, 430 E. Pacific Coast Highway, Long Beach, California.  
V. MUELLER & Co., 320 S. Honore St., Chicago 12, Illinois ..... SE 3-2180  
PEACOCK SURGICAL Co., INC., 1235 Texas Ave., Shreveport, Louisiana ..... Day 3-5276—Night 7-4910  
BETH-MONT SURGICAL SUPPLY Co., 6811 Wisconsin Ave., Chevy Chase, Md.  
THE COLSON-MERRIAM Co., 1623 N. Aisquith St., Baltimore, Maryland ..... Mulberry 2847  
SEILER SURGICAL Co., INC., 111 S. 17th St., Omaha 2, Nebraska ..... ATLantic 5825  
AMSTERDAM BROTHERS, 1060 Broad St., Newark 2, New Jersey  
BURLINGTON SURGICAL APPLIANCES, 314 High St., Burlington, New Jersey ..... Burlington 3-0052  
COSMEVO SURGICAL SUPPLY Co., 236 River St., Hackensack, New Jersey ..... Diamond 3-5555  
FIDELITY MEDICAL SUPPLY Co., 1st & St. Clair Sts., Dayton 2, Ohio ..... MI 7636  
E. A. WARNIK Co., Simon Long Building, 50-52 S. Main St., Wilkes-Barre, Pennsylvania ..... 2-8064  
MARVIN F. POLARD Co., 1412 E. Broad St., Richmond, Virginia  
KLOMAN INSTRUMENT Co., INC., 1822 Eye St., N.W., Washington 6, D.C. .... ME 3900

## STORES WHERE EVEREST AND JENNINGS PRODUCTS MAY BE RENTED OR PURCHASED

ABBEY RENTS, 600 S. Normandie Ave., Los Angeles 5, Calif. .... DU-4-5292; PL-2-3131  
AN-1-6134; HO-2-0924; HE-2-2973; TO-6-1714; OX-4-2603; OR-7-6178; CI-3-2101  
PO-39105; DI-4-7137; OL-2-2760; SY-5-7041; EX-4-3232; KI-5-1181  
ABBEY RENTS, 2895 El Cajon Blvd., San Diego 4, Calif. .... ATwater-1-8151  
ABBEY RENTS, 1314 Post Street, San Francisco 9, Calif. .... GRaystone-4-2525  
ABBEY RENTS, 2841 S. El Camino Real, San Mateo, Calif. .... FIreside-5-5775  
ABBEY RENTS, 2315 Broadway, Oakland 12, Calif. .... HIgate-4-8181  
ABBEY RENTS, 1827 "J" Street, Sacramento 14, Calif. .... GILbert-8-9151  
ABBEY RENTS, 1000 E. Burnside, Portland 14, Ore. .... BELmont-4-5001  
ABBEY RENTS, 1000 Pike Street, Seattle 1, Wash. .... SEneca-5040  
ABBEY RENTS, 350 Broadway, Denver 9, Colo. .... PEarl-3-4651  
ABBEY RENTS, 4041 Broadway, Kansas City 11, Mo. .... JEfferson-1-5200  
ABBEY RENTS, 3230 Washington Blvd., St. Louis 3, Mo. .... OL-2-5700; MI-7-3300  
ABBEY RENTS, 2220 Lyndale Ave. S., Minneapolis 5, Minn. .... FE-8-8931; MI-6-6546  
ABBEY RENTS, 2824 W. Fond du Lac Ave., Milwaukee 10, Wis. .... UPTown-3-2000  
ABBEY RENTS, 3545 Reading Road, Cincinnati 29, Ohio .... AVon-1-7000  
BEST RENTALS, 2025 S. Shepherd Drive, Houston 19, Texas .... JACkson-3-4416  
MEDICAL ARTS SUPPLY, 233 Washington S.E. and Pharmacy 20-23 Sheldon S.E., Grand Rapids 2, Mich. .... 9-8274  
FIDELITY MEDICAL SUPPLY Co., 1st and St. Clair Sts., Dayton 2, Ohio ..... MI 7636  
DOWD CHAIR RENTAL & SALES, 138 South Highland Ave., Pittsburgh, Pa. .... MONTrose 1-5355  
DOWD CHAIR RENTAL & SALES, 4848 Woodward Ave., Detroit 1, Mich. .... Temple 3-3490  
DOWD CHAIR RENTAL & SALES, 310 N.E. 61st St., Miami 37, Fla. .... 89-8561  
DOWD CHAIR RENTAL & SALES, 392 Franklin St., Buffalo, New York .... Cleveland 3335  
DOWD CHAIR RENTAL & SALES, (Canada) Ltd., 196 George St., Toronto 2, Ontario, Canada .... WALnut 4-6644  
ELMIRA DRUG & CHEMICAL Co., 368 No. Main St., Elmira, New York ..... 6289  
SAM FORTAS HOUSE FURNISHING Co., INC., Main and Poplar, Memphis, Tenn. .... JACkson 5-3515  
HEYL PHYSICIANS SUPPLY Co., 419 State St., Erie, Pennsylvania ..... 2-6785

## MANUFACTURERS OF ORTHOPEDIC AND PROSTHETIC APPLIANCES

BIRMINGHAM ARTIFICIAL LIMB Co., 410 N. 19th St., Birmingham 3, Alabama ..... 3-1786  
FIDELITY ORTHOPEDIC, 5th and Main Sts., Dayton 2, Ohio  
GEORGE S. ANDERSEN Co., 3419 Walnut St., Philadelphia 4, Pennsylvania  
YALE SURGICAL Co., 1004 Grand Ave., New Haven 11, Connecticut ..... State 7-3005

## UNCLASSIFIED

THE LIEBEL-FLARSHEIM Co., Manufacturers of Apparatus for Physical Medicine, Cincinnati 15, Ohio ..... PO 2700  
NATIONAL SPORTS EQUIPMENT Co., Mfgs. of Therapy Gym Mats, 360-370 N. Marquette St., Fond du Lac Wisc 8200

IF NOT DELIVERED IN 5 DAYS  
RETURN TO  
EDWARD F. MECHELLA  
BOX 478, MONTROSE, N. Y.

DR. C.H. McCLOY  
DEPT. OF PHYSICAL EDUCATION  
STATE UNIVERSITY OF IOWA  
IOWA CITY, IOWA



# La Berne

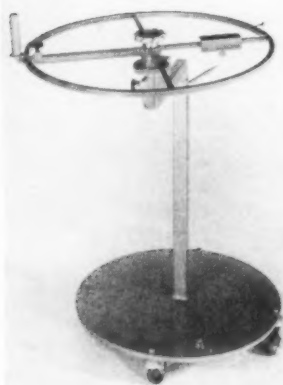
## PHYSICAL THERAPY EQUIPMENT



### WHEEL CHAIR TABLE

This table is built of tubular steel adjustable in height from 29" to 40". Has a formica top 32" by 36" adjustable to any position. This table was designed at the request of many departments for use as a typewriter table, powder board, work table and drawing board, for wheel chair patients.

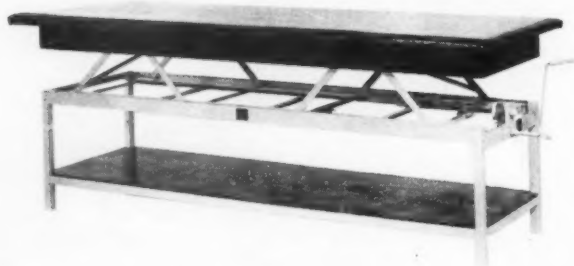
Price \$195.00



### EXERCISE AND SHOULDER WHEEL

The LaBerne Portable Exercise and Shoulder Wheel was designed for overbed or wheel chair use as well as Physical Therapy department. Mounted on a "telescopic" tube with height adjustment it has steel base and lock casters. The wheel itself is mounted with swivel joint adjustable to five positions from vertical to horizontal, offering many exercises not previously possible. The counter-balanced wheel is 24" with an adjustable handle making available up to a 48" arc, and is mounted on roller bearings with sensitive resistance adjustment.

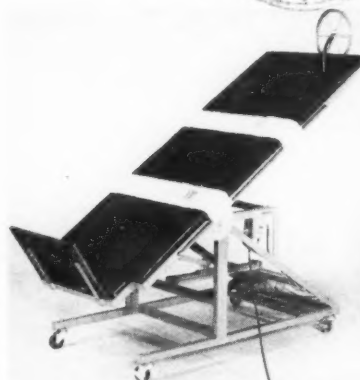
Price \$145.00



### ADJUSTABLE HEIGHT TREATMENT TABLE

LaBerne Adjustable Height Treatment Table is built of 1 1/4" tubular steel and angle iron with walnut finish top, with built-in linen shelf. Table is 78" long, 28" wide. Adjustable in height from 27" to 36" by hand crank.

Price \$225.00



### UTILITY ELECTRIC WALK-OFF TABLE

A new model electric table designed to meet the budgets of small hospitals. This table is sturdily built of tubular steel and angle iron with lock casters, walnut finished hardwood top, restrainer straps and footboard. Has automatic cut-off switches for both up and down positions furnishing any degree of tilt from vertical to horizontal.

Price \$395.00

Also available with plastic covered foam rubber top \$40.00 extra

Cervical traction attachment

\$25.00 extra

Same as above available in hand-operated model Price \$225.00



### LABERNE PARALLEL BARS

easy adjustment, automatic spacing—

New parallel Bars requiring only 15" of floor space for each section. Built with 10° angle offering automatic width adjustment. Has height adjustment from 17" to 44". Available in lengths from 8' to 30'. May be had with hardwood handrails or with 1 1/4" round atactic bronze handrails. Prices start at \$295.00

WRITE FOR LITERATURE

All prices FOB Columbia



**La Berne** Manufacturing Company, P. O. Box 5245,

Columbia, S. C. Phone 2-8609

ORIGINATORS OF THE "WALK-OFF" PHYSICAL THERAPY TABLE



